ANNUAL REGISTER

OF THE

UNITED STATES NAVAL ACADEMY,

ANNAPOLIS, MD.

THIRTY-FIRST ACADEMIC YEAR,

1880-81.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1880.

CONTENTS.

	Page.
HISTORICAL SKETCH	4
BOARD OF VISITORS	6
ACADEMIC CALENDAR	6
CALENDAR, 1880–81	7
OFFICERS	8
ACADEMIC BOARD	11
CADET-OFFICERS	11
CADETS, WITH RELATIVE STANDING IN CLASSES	12
NUMERICAL SUMMARY	35
RESIGNATIONS AND DISMISSALS	36
ANNUAL RIFLE-MATCH	37
PRACTICE-CRUISE, 1880	38
TABLE OF COEFFICIENTS	42
MERIT-ROLLS, 1879–80	43
REQUISITES FOR ADMISSION	59
COURSE OF INSTRUCTION	71
PROGRAMME OF RECITATIONS	76
EXAMINATION-PAPERS, 1879–80	80
INDEX TO EXAMINATION-PAPERS	125

THE
UNITED STATES NAVAL ACADEMY.

The United States Naval Academy was founded in 1845, by Hon. George Bancroft, Secretary of the Navy, in the administration of President James K. Polk. It was formally opened October 10, of that year, under the name of the Naval School, with Commander Franklin Buchanan as Superintendent. It was placed at Annapolis, Md., on the land occupied by Fort Severn, which was given up by the War Department for the purpose. The course was fixed at five years, of which the first and last only were spent at the School, the intervening three being passed at sea This arrangement was not strictly adhered to, the exigencies of the service making it necessary, in many cases, to shorten the period of study. In January, 1846, four months after the opening of the School, the students consisted of 36 Midshipmen, of the date of 1840, who were preparing for the examination for promotion; 13 of the date of 1841, who were to remain until drafted for service at sea; and 7 Acting Midshipmen, appointed since September of the previous year. The Midshipmen of the date of 1840 were the first to be graduated, finishing their limited course in July, 1846, and they were followed in order by the subsequent dates until the reorganization of the School, in 1851.

In September, 1849, a Board was appointed to revise the plan and regulations of the Naval School. The Board was composed of the following officers:

Commodore William B. Shubrick,
Commander Franklin Buchanan,
Commander Samuel F. Dupont,
Commander George P. Upshur,
Surgeon W. S. W. Ruschenberger,
Professor William Chauvenet,
Captain Henry Brewerton, U. S. A.

The plan reported by the Board was approved, and went into operation July 1, 1850.

The new organization provided for a course of seven years, the first two and last two at the School and the three intermediate years at sea. The School was placed under the supervision of the Bureau of Ordnance and Hydrography, and its name was changed to the United States Naval Academy. The corps of professors was enlarged, the course was extended, and the system of separate departments, with executive heads, was fully adopted. It was provided that a Board of Visitors should make an annual inspection of the Academy, and report upon its condition to the Secretary of the Navy. A suitable vessel was attached to the Academy as a practice-ship, and the annual practice-cruises were begun.

After the system had been in operation a year new changes were proposed, and the recommendations of the Academic Board on the subject were referred to the Board of Examiners of the year 1851, composed of the following officers:

Commodore David Conner,
Captain Samuel L. Breese,
Commander C. K. Stribling,
Commander A. Bigelow,
Commander Franklin Buchanan,
Lieutenant Thomas T. Craven.

The change recommended by the Board of Examiners, and adopted by the Department, consisted mainly in leaving out the requirement of three years of sea-service in the middle of the course, thus making the four years of study consecutive. The practice-cruise supplied the place of the omitted sea-service, and gave better opportunities of training. The change went into operation in November, 1851, together with other improvements recommended by the Board. The system has continued, with slight modifications, to the present time. The first class to receive the benefit of it was that which entered in 1851. Six members of this class completed the course in three years, and were graduated in June, 1854; the rest of the class followed in 1855.

In May, 1861, on the outbreak of the war, the Academy was removed to Newport, R. I. The three upper classes were detached and ordered to sea, and the remaining Acting Midshipmen were quartered in the Atlantic House and on board the frigates Constitution and Santee. In September, 1865, the Academy was moved back to Annapolis, where it has since remained.

When the Bureau of Navigation was established, July 5, 1862, the Academy was placed under its supervision; March 1, 1867, it was placed under the direct care and supervision of the Navy Department, the administrative routine and financial management being still conducted through the Bureau. On the 11th of March, 1869, all official connection with the Bureau came to an end.

The term of the academic course was changed by law, March 3, 1873, from four to six years. The change took effect with the class which entered in the following summer.

In 1866, a class of Acting Third Assistant Engineers was ordered to the Academy for instruction. The course embraced the subjects of steam-engineering, iron-manufacture, chemistry, and mechanics, and practical exercises with the steam-engine and in the machine-shop. This class was graduated in June, 1868, together with two Cadet-Engineers who had entered the Academy in 1867. After an interval of four years, in October, 1871, a new class of Cadet-Engineers was admitted. This class followed a two years' course, somewhat more extended than that of the class of 1868, and was graduated in 1873. In 1872 and 1873, new classes were admitted, the first of which left the Academy in 1874 and the second in 1875. By an act of Congress approved February 24, 1874, the course of instruction for Cadet-Engineers was made four years instead of two; and the new provision was first applied to the class entering the Academy in the year 1874. This class was graduated in June, 1878.

SUPERINTENDENTS OF THE NAVAL ACADEMY SINCE ITS FOUNDATION.

Assumed Command—

Sept. 3, 1845.—Commander Franklin Buchanan.
Mar. 15, 1847.—Commander George P. Upshur.
July 1, 1850.—Commander Cornelius K. Stribling.
Nov. 1, 1853.—Commander Louis M. Goldsborough.
Sept. 15, 1857.—Captain George S. Blake.
Sept. 9, 1865.—Rear-Admiral David D. Porter.
Dec. 1, 1869.—Commodore John L. Worden.
Sept. 22, 1874.—Rear-Admiral C. R. P. Rodgers.
July 1, 1878.—Commodore Foxhall A. Parker.
Aug. 2, 1879.—Rear-Admiral George B. Balch.

BOARD OF VISITORS, JUNE, 1880.

Vice-Admiral S. C. ROWAN, U. S. Navy, *President*.

Professor FRANCIS WAYLAND, *Vice-President*	New Haven, Conn.
Colonel ARCHIE W. CAMPBELL	Wheeling, W. Va.
General LLOYD ASPINWALL	New York, N. Y.
General W. H. DAVIS	Doylestown, Penn.
Colonel E. B. STODDARD	Worcester, Mass.
Hon. EMERSON ETHERIDGE	Memphis, Tenn.
Hon. NEWTON BOOTH	U. S. Senate.
Hon. ZEBULON B. VANCE	U. S. Senate.
Hon. F. E. BELTZHOOVER	House of Representatives.
Hon. C. B. SIMONTON	House of Representatives.
Hon. T. C. POUND	House of Representatives.

ACADEMIC CALENDAR.

1880--81.

1880.		
Oct.	1.—Beginning of first term	Friday.
1881.		
Jan.	24–29.—Semi-annual examination	Monday–Saturday.
Jan.	29.—End of first term	Saturday.
June	1–10.—Annual examination	Wednesday–Friday.
June	10.—End of academic year, 1880–81	Friday.
June	11.—Examination of candidates for admission as Cadet-Midshipmen	Saturday.
Sept.	15.—Examination of candidates for admission as Cadet-Engineers	Thursday.
Sept.	22.—Examination of candidates for admission as Cadet-Midshipmen	Thursday.
Oct.	1.—Beginning of first term, 1881–82	Saturday.

The academic months end on the following days:

1880–81.

October	Oct. 30	February	Feb. 26
November	Nov. 27	March	Mar. 26
December	Dec. 25	April	Apr. 23
January	Jan. 22	May	May 28

1881–82.

October	Oct. 29	December	Dec. 24
November	Nov. 26	January	Jan. 21

CALENDAR FOR 1880–81.

SEPTEMBER.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	----	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	----	----

OCTOBER.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	----	----	----	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	----	----	----	----	----	----

NOVEMBER.

Sun.	M.	T.	W.	T.	F.	Sat.
----	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	----	----	----	----

DECEMBER.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	----	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	----

JANUARY.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	----	----	----	----	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	----	----	----	----	----

FEBRUARY.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	----	----	----	----	----

MARCH.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	----	----

APRIL.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	----	----	----	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

MAY.

Sun.	M.	T.	W.	T.	F.	Sat.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	----	----	----	----

JUNE.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	----	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	----	----

SEPTEMBER.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	----	----	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	----

OCTOBER.

Sun.	M.	T.	W.	T.	F.	Sat.
----	----	----	----	----	----	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	----	----	----	----	----

OFFICERS

OF THE

UNITED STATES NAVAL ACADEMY.

REAR-ADMIRAL GEORGE B. BALCH,

SUPERINTENDENT.

COMMANDER S. D. GREENE,

Senior Aid to the Superintendent.

ACADEMIC STAFF.

COMMANDER F. V. McNAIR,

Commandant of Cadets.

LIEUTENANT W. H. BROWNSON,

Assistant to the Commandant of Cadets.

SEAMANSHIP, NAVAL TACTICS, AND NAVAL CONSTRUCTION.

COMMANDER E. M. SHEPARD,

Head of Department.

LIEUTENANT-COMMANDER FRANCIS A. COOK,
LIEUTENANT-COMMANDER JOHN SCHOULER,
LIEUTENANT-COMMANDER EDWIN WHITE,
LIEUTENANT E. DE F. HEALD,
LIEUTENANT D. DELEHANTY,

Instructors in Seamanship, Naval Tactics, and Naval Construction.

MATTHEW STROHM,

Instructor in Boxing, Swimming, and Gymnastics.

ORDNANCE AND GUNNERY.

COMMANDER H. B. ROBESON,

Head of Department.

LIEUTENANT-COMMANDER C. M. THOMAS,
LIEUTENANT W. H. PARKER, JR.,
LIEUTENANT J. W. MILLER,
LIEUTENANT RICHARD RUSH,
MASTER C. H. LYMAN,

Instructors in Naval Gunnery and Infantry Tactics.

ANTOINE J. CORBESIER,

Sword-Master.

JEAN B. RETZ,
GEORGE HEINTZ,

Assistant Sword-Masters.

MATHEMATICS.

PROFESSOR W. W. HENDRICKSON,

Head of Department.

LIEUTENANT ASA WALKER,
LIEUTENANT BENJAMIN F. TILLEY,
LIEUTENANT F. G. HYDE,
LIEUTENANT S. C. PAINE,
LIEUTENANT H. W. SCHAEFER,
MASTER C. W. BARTLETT,

Instructors in Mathematics.

STEAM-ENGINEERING.

CHIEF ENGINEER J. P. SPRAGUE,

Head of Department.

PASSED ASSISTANT ENGINEER W. A. WINDSOR,
PASSED ASSISTANT ENGINEER J. C. KAFER,
PASSED ASSISTANT ENGINEER R. W. MILLIGAN,
PASSED ASSISTANT ENGINEER J. S. OGDEN,
PASSED ASSISTANT ENGINEER G. H. KEARNEY,
ASSISTANT ENGINEER A. M. MATTICE,
ASSISTANT ENGINEER G. B. RANSOM,

Instructors in Steam-Engineering.

ASTRONOMY, NAVIGATION, AND SURVEYING.

LIEUTENANT-COMMANDER P. F. HARRINGTON,

Head of Department.

LIEUTENANT-COMMANDER C. J. TRAIN,
LIEUTENANT RAYMOND P. RODGERS,
LIEUTENANT WILLIAM J. BARNETTE,

Instructors in Astronomy, Navigation, and Surveying.

PHYSICS AND CHEMISTRY.

PROFESSOR HENRY D. TODD,

Head of Department.

LIEUTENANT CHARLES BELKNAP,
LIEUTENANT J. B. MURDOCK,
PROFESSOR N. M. TERRY, A. M., PH. D.,
PROFESSOR CHARLES E. MUNROE, S. B.,

Instructors in Physics and Chemistry.

MECHANICS AND APPLIED MATHEMATICS.

PROFESSOR J. M. RICE, S. B., PH. D.,

Head of Department.

LIEUTENANT-COMMANDER S. H. BAKER,
LIEUTENANT CHARLES A. STONE,
LIEUTENANT ALEXANDER MCCRACKIN,

Instructors in Mechanics and Applied Mathematics.

ENGLISH STUDIES, HISTORY, AND LAW.

PROFESSOR J. RUSSELL SOLEY, A. B.,
Head of Department.

Lieutenant John V. B. Bleecker,
Lieutenant E. D. Taussig,
Lieutenant George W. Tyler,
Lieutenant M. Fisher Wright,
Master Charles R. Miles,
Professor William W. Fay, A. M.,
Instructors in English Studies, History, and Law.

MODERN LANGUAGES.

PROFESSOR L. F. PRUD'HOMME, A. M.,
Head of Department.

Master H. L. Green,
Assistant Professor A. V. S. Courcelle,
Assistant Professor Eugene Dovilliers,
Assistant Professor Jules Leroux,
Assistant Professor Hippolyte Dalmon,
Instructors in French and Spanish.

Professor Pedro Montaldo,
Instructor in Spanish.

DRAWING.

PROFESSOR MARSHAL OLIVER,
Head of Department.

Master Corwin P. Rees,
Assistant Professor C. F. Blauvelt, N. A.,
Instructors in Drawing.

OFFICERS NOT ATTACHED TO THE ACADEMIC STAFF.

COMMANDER T. F. KANE, *In charge of Practice-Ships.*
MEDICAL INSPECTOR A. C. GORGAS, M. D.
SURGEON M. L. RUTH, M. D.
PASSED ASSISTANT SURGEON M. D. JONES, M. D.
PASSED ASSISTANT SURGEON G. P. LUMSDEN, M. D.
PAY DIRECTOR JAMES D. MURRAY, *Treasurer.*
PAYMASTER L. G. BILLINGS, *Commissary.*
PAYMASTER F. H. SWAN, A. M., *Storekeeper.*
CHAPLAIN J. S. WALLACE, A. M.
ASSISTANT PROFESSOR THOMAS KARNEY, A. M., *Librarian.*
J. J. GRAFF, *Assistant Librarian.*
R. M. CHASE, *Secretary.*

MARINE GARRISON.

CAPTAIN ROBERT W. HUNTINGTON, *Commanding.*
Captain George B. Haycock.
First Lieutenant W. S. Muse.
Second Lieutenant T. G. Fillette.

Boatswain C. E. Hawkins.
Gunner Robert Sommers.

MATES.

C. J. Murphy	*Attached to the United States Gunnery-ship Santee and to the sloop-of-war Dale.*
Samuel Gee	
William G. Smith	
James Hill	
Robert Silver	*Attached to the United States Steamer Nantucket.*
Benjamin G. Perry	*Attached to the United States Steamer Phlox (steam-tender).*
Joseph Rogers	

ACADEMIC BOARD.

Commander F. V. McNair, U. S. N.
Commander H. B. Robeson, U. S. N.
Commander E. M. Shepard, U. S. N.
Professor W. W. Hendrickson, U. S. N.
Chief Engineer J. P. Sprague, U. S. N.
Lieutenant-Commander P. F. Harrington, U. S. N.
Professor J. M. Rice, Ph. D., U. S. N.
Professor J. R. Soley, A. B., U. S. N.
Professor H. D. Todd, U. S. N.
Professor L. F. Prud'homme, A. M.
Professor Marshal Oliver.

CADET-OFFICERS.

CADET-LIEUTENANT-COMMANDER.

J. L. SCHOCK.

CADET-LIEUTENANTS.

R. B. DASHIELL.
J. A. HOOGEWERFF.
J. L. REES.
F. C. RIDER.

CADET-MASTERS.

H. ELDREDGE, *Adjutant.*

F. E. SUTTON.
F. H. HUNICKE.
J. J. WOODWARD.
E. E. CAPEHART.

CADET-ENSIGNS.

F. E. BUNTS.
R. P. FORSHEW.
G. P. BLOW.
E. CARROLL.

CADET-PETTY-OFFICERS.

First Captains of Gun's Crews.

J. E. Mahoney.
L. Karmany.
E. H. Harrison.
C. A. Doyen.
W. H. Stayton.
J. W. Weeks.
C. P. George.
H. K. White.
W. F. Flournoy.
G. G. Rodgers.
H. B. Wilson.
S. Bryan.
R. P. Hains.
H. R. Cohen.
E. M. Harmon.
C. H. Lauchheimer.

Second Captains of Gun's Crews.

A. C. Oliphant.
J. A. Kimball.
J. H. Linnard.
I. McJunkin.
W. G. Ford.
B. G. Pierce.
C. W. Stewart.
W. A. Gresham.
F. W. Smies.
J. H. Colwell.
G. Barnett.
G. Wilkes.
H. L. Ballentine.
G. M. Buck.
B. H. Craig.
M. Craven.

CADET-PASSED-ASSISTANT-ENGINEER.

J. M. WHITHAM.

CADET-ASSISTANT-ENGINEERS.

G. KAEMMERLING.
O. B. SHALLENBERGER.

Cadet-Machinists.

I. B. Parsons.
W. S. Smith.
F. B. Dowst.
L. Bankson.
De W. C. Redgrave.
J. E. Byrne.
L. B. Perkins.
W. T. Webster.

CADET-

Class of 1880

Order of general merit.	Name.	State.	Date of admission.	Age at date of admission.	
				Years.	Months.
*1	**Alger, Philip Rounseville**	At large	Sept. 11, 1876	17	0
*2	**Dresel, Herman George**	Ohio	Sept. 18, 1876	17	8
3	Norton, Luman Spooner	Vermont	Sept. 12, 1876	17	0
4	Phelps, Harry	New Jersey	Sept. 13, 1876	15	7
5	Bernadou, John Baptiste	At large	Sept. 12, 1876	17	10
6	Hourigan, Patrick William	New York	June 21, 1876	16	7
7	Ackerman, Albert Ammerman	New Jersey	June 21, 1876	16	11
8	Wolfersberger, William Henry	Illinois	Sept. 12, 1876	17	7
9	Poundstone, Homer Clarke	West Virginia	Sept. 24, 1874	14	0
10	Haskell, Porter David	Michigan	Sept. 12, 1876	17	4
11	Niblack, Albert Parker	Indiana	Sept. 12, 1876	17	2
12	Wilkinson, Ernest	Louisiana	June 19, 1875	17	2
13	Howze, Arthur Robertson	Mississippi	June 21, 1876	15	7
14	Truxtun, William	At large	June 21, 1876	15	3
15	Morgan, Stokely	Arkansas	June 14, 1876	16	11
16	West, George Ernest	New York	Sept. 12, 1876	14	5
17	Watters, John Sproston	At large	June 21, 1876	14	11
18	Emerson, William Henry	At large	Oct. 10, 1876	16	4
19	Parke, Thomas Aloysius	West Virginia	June 21, 1876	16	8
20	Duncan, Louis	Kentucky	Sept. 11, 1876	15	6
21	Muir, William Carpenter Pendleton	Kentucky	June 21, 1876	17	3
22	Cabaniss, Charles	Virginia	June 21, 1876	16	8
23	Haeseler, Francis Joy	Pennsylvania	Sept. 12, 1876	16	5
24	Van Duzer, Louis Sayre	New York	Sept. 13, 1876	15	3
25	Rohrbacher, Joseph Hamilton	Pennsylvania	June 21, 1876	17	9
26	Beale, Joseph	Pennsylvania	Oct. 12, 1874	14	10
27	Simpson, Edward, jr	Pennsylvania	June 21, 1876	17	8
28	Drake, James Calhoun	Arkansas	June 19, 1875	17	11
29	Dickson, Joseph Morrill	Texas	June 14, 1876	15	5
30	Dillman, George Lincoln	Iowa	June 19, 1876	16	1
31	Bowdon, Frank Welch	Texas	Sept. 11, 1875	17	7
32	Mayer, Augustus Newkirk	Iowa	June 17, 1876	17	3
33	Sims, William Sowden	At large	June 21, 1876	15	9
34	Buchanan, Wilson Wildman	Ohio	June 19, 1875	17	3
35	Leiper, Edwards Fayssoux	Pennsylvania	June 21, 1875	16	7
36	Brainard, Fred Roland	Illinois	June 21, 1876	17	9
37	Safford, William Edwin	Ohio	Sept. 11, 1876	16	9
38	Eyre, Manning Kennard	At large	Sept. 11, 1876	15	6
39	Gorgas, Miles Carpenter	At large	Sept. 11, 1875	14	2
40	Scott, Richard Hamilton	Minnesota	June 21, 1876	17	9
41	Wall, Francis Richardson	Mississippi	June 23, 1876	16	11
42	Finley Henry Marzette	Ohio	June 21, 1875	16	5

MIDSHIPMEN.

—62 *members.*

Order of merit in—										Number of demerits.	Sea-service in practice-ships.		Order of general merit.
Seamanship.	Ship-building.	Ordnance.	Marine engines.	Theoretical navigation.	Practical navigation.	Heat.	Naval architecture (elective).	Public law.	Spanish.		Months.	Days.	
2	4	2	2	2	1	2	1	3	8	148	5	4	*1
9	1	1	4	3	2	1	2	4	4	89	5	4	*2
16	6	6	5	7	7	7	4	25	19	141	5	4	3
6	7	4	1	1	3	5	5	15	5	88	5	4	4
28	8	3	14	18	15	10	2	25	2	139	5	4	5
2	10	12	18	5	11	3	....	1	20	144	5	4	6
10	2	8	11	10	22	9	7	30	37	92	5	4	7
26	21	10	12	8	5	8	....	11	15	57	5	4	8
5	2	7	10	4	4	5	....	10	9	93	5	8	9
18	22	18	14	11	11	15	....	17	11	48	5	4	10
17	11	4	13	12	24	27	....	8	32	62	5	4	11
24	43	34	9	12	27	17	....	37	7	108	5	5	12
23	25	24	28	5	13	19	8	22	2	34	5	4	13
6	9	9	8	14	17	12	6	4	53	72	5	4	14
33	15	26	26	9	10	25	....	19	32	68	5	4	15
46	40	42	29	24	8	14	9	22	15	111	5	4	16
4	5	18	22	30	20	11	....	38	20	140	5	4	17
15	26	17	7	22	6	3	....	46	13	94	5	4	18
40	31	22	17	14	18	19	....	21	11	69	5	4	19
21	12	14	6	18	9	15	....	25	23	107	5	4	20
20	32	21	20	22	33	19	....	33	23	102	5	4	21
8	13	15	20	32	28	25	....	17	10	27	5	4	22
1	15	12	19	17	13	43	....	42	47	94	5	4	23
26	18	29	14	18	23	17	....	14	50	68	5	4	24
43	36	29	37	39	39	22	....	12	22	94	5	4	25
10	42	54	46	28	40	32	....	15	27	143	5	4	26
13	15	11	31	25	33	27	....	42	39	86	5	4	27
48	26	40	32	16	20	29	....	54	29	138	5	4	28
57	44	22	24	27	35	22	....	2	26	51	5	4	29
38	59	41	47	53	38	59	....	56	28	155	5	4	30
19	28	31	53	42	44	40	....	4	17	57	5	4	31
42	34	26	38	29	32	34	....	33	37	127	5	4	32
30	14	16	3	26	30	12	....	24	29	146	5	4	33
21	24	34	34	37	24	34	....	47	29	31	5	5	34
31	18	24	25	35	36	38	....	29	42	74	5	4	35
32	44	20	27	45	15	30	....	59	46	113	5	4	36
52	33	45	32	43	50	33	....	41	1	98	5	4	37
36	39	36	35	36	24	34	....	42	14	149	5	4	38
37	53	48	39	41	42	44	....	60	6	105	5	5	39
33	28	32	23	31	37	22	....	25	29	127	5	4	40
44	51	38	42	38	28	38	....	19	17	136	5	4	41
40	46	48	29	18	18	48	....	13	32	159	5	4	42

CADET-

Class of 1880—62

Order of general merit.	Name.	State.	Date of admission.	Age at date of admission.	
				Years.	Months.
43	Fillebrown, Horatio Ladd	South Carolina	June 19, 1875	16	1
44	Worthington, Thomas	Alabama	June 19, 1876	16	7
45	Maxwell, William John	At large	June 9, 1874	15	2
46	Huntoon, Fitz-Aubert	Texas	Sept. 15, 1875	16	10
47	Swift, Franklin	Massachusetts	June 9, 1874	16	1
48	Hill, Charles Homer	Wisconsin	Sept. 14, 1875	16	0
49	French, George Ross	At large	June 21, 1875	17	11
50	Ashmore, Henry Beckwith	At large	Oct. 3, 1876	15	4
51	Gray, James	Illinois	Sept. 12, 1876	17	8
52	Dewey, Theodore Gibbs	South Carolina	June 19, 1875	16	0
53	Cramer, Ambrose	Maryland	Sept. 28, 1874	17	6
54	Luby, John Frazer	New York	June 21, 1875	17	11
55	Richardson, Walter Gates	Massachusetts	Sept. 12, 1876	16	9
56	Clark, Lewis Jacob	Alabama	Sept. 11, 1876	14	7
57	Nash, Edwin White	Ohio	Sept. 11, 1876	16	11
58	Brown, James Stephen	Tennessee	Sept. 11, 1875	17	2
59	Belmont, Oliver Hazard Perry	New York	Sept. 30, 1874	14	10
60	Brinley, Edward	At large	Sept. 18, 1876	16	3
61	Rodman, Hugh	Kentucky	Sept. 13, 1875	16	8
62	Bullitt, Howard Henry	Kentucky	Sept. 11, 1875	17	11

MIDSHIPMEN.

members—Continued.

Order of merit in—										Number of demerits.	Sea-service in practice-ships.		Order of general merit.
Seamanship.	Ship-building.	Ordnance.	Marine engines.	Theoretical navigation.	Practical navigation.	Heat.	Naval architecture (elective.)	Public law.	Spanish.		Months.	Days.	
56	60	52	39	49	56	54	....	58	44	106	5	4	43
10	20	33	56	51	50	50	....	32	32	97	5	4	44
24	23	36	60	55	59	58	....	38	55	88	5	4	45
44	36	42	42	32	45	42	....	52	52	139	5	4	46
35	40	46	39	43	40	44	....	38	56	115	5	5	47
13	36	48	36	57	58	50	....	9	49	155	4	16	48
54	52	53	54	61	50	31	....	33	47	131	7	23	49
38	34	60	45	39	54	41	....	52	25	154	5	4	50
51	56	28	51	46	50	56	....	7	58	127	5	4	51
58	54	46	55	51	56	47	....	50	62	94	5	4	52
48	50	56	58	56	46	50	....	47	60	118	5	5	53
29	30	39	50	50	48	54	....	33	43	144	5	5	54
60	62	48	47	60	48	49	....	30	36	140	5	4	55
53	49	59	57	47	30	28	....	50	60	153	5	4	56
54	48	54	44	32	43	46	....	45	50	166	5	4	57
47	57	61	59	48	60	57	....	57	57	153	5	4	58
48	60	62	61	62	62	60	....	62	44	144	5	5	59
61	55	42	52	53	46	62	....	49	39	52	5	4	60
58	46	56	47	58	54	50	....	55	58	117	5	4	61
62	58	58	62	58	61	60	....	61	54	98	5	4	62

CADET-

First class—

Order of annual merit.	Name.	State.	Date of admission.	Age at date of admission.	
				Years.	Months.
22	Andrews, Horace Burlingame	Michigan	June 22, 1876	15	1
35	Ballentine, Henry Laird	Tennessee	June 20, 1877	16	6
28	Barnett, George	Wisconsin	June 19, 1877	17	6
27	Blow, George Preston	Virginia	Sept. 14, 1876	15	11
68	Bonfils, Thomas Lewis	Missouri	June 19, 1875	17	8
54	Bryan, Samuel	Maryland	June 14, 1876	17	3
39	Buck, Guy Morville	Maine	Sept. 11, 1877	16	10
14	Bunts, Frank Emory	Ohio	June 20, 1877	16	1
11	Capehart, Edward Everett	Ohio	June 22, 1877	17	11
12	Carroll, Eugene	At large	June 19, 1877	16	2
55	Clarke, George	Illinois	June 22, 1877	14	11
52	Cockle, Rudolphus Rouse	Illinois	June 21, 1875	17	8
42	Cohen, Harry Radcliffe	At large	June 20, 1877	15	4
40	Colwell, James Hall	At large	June 20, 1877	16	10
65	Craig, Ben Holliday	Missouri	June 14, 1876	16	8
56	Craven, Macdonough	New York	June 21, 1876	17	7
58	Crenshaw, James Davis	Texas	Sept. 11, 1877	17	10
*9	**Dashiell, Robert Brooke**	At large	June 19, 1877	16	11
57	Donnelly, Michael Joseph	Wisconsin	June 21, 1877	17	7
20	Doyen, Charles Augustus	New Hampshire	June 21, 1876	16	9
64	Dresser, James Walter	Minnesota	June 21, 1877	16	8
15	Eldredge, Houston	At large	Oct. 2, 1876	15	7
49	Emmet, William Le Roy	At large	June 26, 1876	16	11
37	Flournoy, William Francis	Louisiana	June 19, 1877	17	9
45	Ford, William Griffing	Arkansas	Sept. 11, 1877	15	7
19	Forshew, Robert Pierpont	New York	June 21, 1876	16	11
43	George, Charles Peaslee	Illinois	July 1, 1876	16	3
66	Gresham, William Albert	Indiana	June 19, 1875	17	3
34	Haines, Henry Cargill	At large	June 26, 1875	15	7
53	Hains, Robert Peter	Maine	Sept. 18, 1876	16	3
46	Harmon, Eugene Marion	Ohio	June 20, 1877	17	10
25	Harrison, Edward Hasson	At large	June 21, 1877	15	10
18	Hasson, Alexander Ritchie	At large	June 21, 1875	15	4
*4	**Hoogewerff, John Adrian**	At large	June 21, 1877	16	7
24	Hunicke, Felix Harman	Missouri	Sept. 11, 1877	17	6
*7	**Karmany, Lincoln**	Pennsylvania	Sept. 12, 1877	17	0
51	Kase, Spencer Mettler	Illinois	Sept. 11, 1877	17	10
36	Kimball, John Arthur	Massachusetts	Sept. 12, 1877	17	0
17	Lauchheimer, Charles Henry	Maryland	Sept. 11, 1877	17	11
77	Lindsey, John Howard	Pennsylvania	June 21, 1876	16	2
*3	**Linnard, Joseph Hamilton**	Pennsylvania	June 21, 1877	16	9
30	Mahoney, James Edward	Massachusetts	Sept. 12, 1876	16	9
63	Matthews, Thomas Henry	Pennsylvania	Sept. 12, 1876	16	1
59	McCrea, Alexander Sterling	At large	Oct. 2, 1876	17	2

MIDSHIPMEN.

77 members.

Order of merit in—								Number of demerits.	Sea-service in practice-ships.		Order of annual merit.
Seamanship.	Naval tactics.	Ordnance instructions and infantry tactics.	Astronomy.	Heat and light.	Mechanics and applied mathematics.	Composition.	French.		Months.	Days.	
24	8	37	22	18	44	37	11	84	4	12	22
35	34	51	41	27	39	17	30	131	4	12	35
21	28	34	19	23	44	37	61	31	4	12	28
9	17	4	32	42	26	23	60	158	4	12	27
73	37	73	52	56	56	76	76	160	4	28	68
50	18	48	52	50	48	57	41	127	4	12	54
47	21	61	38	23	49	66	56	35	4	12	39
7	7	29	25	13	20	29	17	26	4	12	14
14	27	26	11	11	14	45	8	68	4	12	11
33	23	22	9	19	10	15	29	103	4	12	12
68	44	56	34	42	27	57	63	148	4	12	55
25	71	45	43	61	54	20	53	185	4	12	52
17	14	29	43	49	68	42	44	60	4	12	42
44	49	26	32	29	60	66	43	80	4	12	40
59	56	77	68	53	62	64	55	123	4	12	65
5	40	45	63	74	60	44	44	180	4	12	56
39	77	49	39	64	34	77	47	113	4	12	58
1	2	1	15	16	13	4	3	25	4	12	*9
53	52	49	45	25	68	73	42	160	4	12	57
20	35	10	17	34	21	24	13	155	4	12	20
63	67	65	58	68	32	61	67	181	4	12	64
3	11	3	21	32	30	14	15	71	4	12	15
45	32	36	34	68	25	37	77	188	4	12	42
74	43	43	29	20	39	35	6	122	4	12	37
55	50	8	34	31	68	54	53	90	4	12	45
31	25	12	18	22	30	10	21	31	4	12	19
37	48	15	63	35	50	50	50	85	4	12	43
56	39	56	73	58	77	33	63	76	4	28	66
29	47	14	41	44	27	20	37	133	4	12	34
60	55	16	49	40	51	45	50	147	4	12	53
17	53	41	30	56	64	24	37	189	4	12	46
21	5	40	49	17	17	50	67	93	4	12	25
28	37	20	13	12	19	33	47	187	4	28	18
9	5	6	5	2	6	6	18	89	4	12	*4
34	42	18	52	48	17	12	7	68	4	12	24
6	46	21	2	5	16	2	3	49	4	12	*7
66	70	62	27	51	44	31	25	42	4	12	51
21	44	37	24	38	34	45	36	180	4	12	36
27	58	18	26	10	23	41	8	150	4	12	17
77	78	72	75	70	71	45	70	174	4	12	77
11	12	24	3	6	2	12	10	94	4	12	*3
25	16	17	59	37	53	19	15	74	4	12	30
72	61	64	60	53	38	63	34	212	4	12	63
62	61	66	69	60	55	28	12	183	4	12	59

CADET-

First class—77

Order of annual merit.	Names.	State.	Date of admission.	Age at date of admission.	
				Years.	Months.
48	McJunkin, Ira	Pennsylvania	June 20, 1877	17	4
75	McKee, Llewellyn Thomas	Pennsylvania	June 20, 1877	17	0
76	Morgan, Daniel	Kentucky	Sept. 11, 1877	17	10
26	Moses, Franklin James	South Carolina	Sept. 11, 1877	16	9
71	Oliphant, Alexander Coulter	New Jersey	Sept. 12, 1877	17	5
70	Orlopp, Max Anton	Arkansas	June 19, 1876	17	1
62	Parker, Felton	Iowa	Nov. 6, 1876	16	0
60	Parsons, Arthur Carlton	Iowa	June 21, 1876	17	11
31	Perkins, Con Marrast	Georgia	Sept. 11, 1875	14	11
72	Perry, George Ernest	Illinois	Sept. 12, 1876	16	10
29	Pierce, Byron Gilmore	Illinois	June 21, 1877	17	4
50	Printup, David Lawrence	New York	June 21, 1877	17	5
*6	**Rees, John Livermore**	Michigan	June 21, 1877	17	4
*5	**Rider, Frederic Clinton**	Rhode Island	Sept. 12, 1877	17	6
44	Robinson, William Moody	At large	June 23, 1876	17	4
61	Rodgers, Guy George	Tennessee	Sept. 23, 1876	14	1
69	Russell, William Worthington	At large	Sept. 12, 1876	17	9
*1	**Schock, John Loomis**	Pennsylvania	June 19, 1877	17	4
16	Serata, Tasuker	Empire of Japan	Sept. 12, 1877	19	0
32	Smies, Frederick William	Ohio	June 22, 1877	16	6
13	Stayton, William Henry	Delaware	June 21, 1877	16	3
47	Stewart, Charles West	Illinois	June 21, 1877	17	10
*8	**Sutton, Francis Eskridge**	New York	June 21, 1877	16	6
33	Uriu, Sotokichi	Empire of Japan	Sept. 12, 1877	19	0
74	Vance, Zebulon Baird	North Carolina	June 22, 1876	16	0
38	Weeks, John Wingate	New Hampshire	June 21, 1877	17	2
41	Weller, Ovington Eugene	Maryland	Sept. 12, 1877	15	7
10	White, Harry Kidder	Dakota	Sept. 19, 1877	17	6
21	Wilkes, Gilbert	Utah	Sept. 12, 1877	14	0
67	Williamson, Samuel Hill	North Carolina	Sept. 11, 1876	17	10
23	Wilson, Henry Braid	New Jersey	Sept. 11, 1876	15	7
*2	**Woodward, Joseph Janvier**	At large	June 21, 1877	16	9
73	Wright, Silas Haynes	Michigan	June 28, 1876	17	10

MIDSHIPMEN.

members—Continued.

Order of merit in—								Number of demerits.	Sea-service in practice-ships.		Order of annual merit.
Seamanship.	Naval tactics.	Ordnance instructions and infantry tactics.	Astronomy.	Heat and light.	Mechanics and applied mathematics.	Composition.	French.		Months.	Days.	
35	59	9	75	46	76	3	30	25	4	12	48
68	71	66	70	75	71	68	74	177	4	28	75
78	76	78	71	63	66	62	74	118	4	12	76
45	25	43	27	15	15	71	50	166	4	12	26
66	66	69	71	65	74	65	70	30	4	12	71
48	69	70	63	53	52	78	72	194	4	12	70
60	41	53	62	77	71	24	1	217	4	12	62
54	74	53	49	70	56	15	72	125	4	12	60
43	31	13	19	58	22	42	25	99	4	12	31
76	61	71	67	73	62	32	56	187	5	0	72
37	20	29	14	20	39	22	49	175	4	28	29
50	53	53	37	46	39	56	40	112	4	12	50
12	8	4	6	14	5	1	13	157	4	12	*6
12	21	10	8	7	4	4	25	110	4	12	*5
29	64	32	48	38	33	72	66	102	4	12	44
48	28	52	66	61	64	70	34	189	4	12	61
75	68	74	77	65	66	60	3	218	4	12	69
7	3	2	1	1	1	9	23	76	4	12	*1
16	51	66	12	32	7	54	63	65	4	12	16
42	18	35	30	30	34	29	32	128	4	12	32
39	60	33	23	8	9	53	24	173	4	12	13
50	32	59	52	41	37	45	20	193	4	12	47
56	10	28	7	3	8	10	2	57	4	12	*8
17	15	59	45	45	39	8	32	47	4	12	33
68	65	74	61	76	56	74	67	199	5	0	74
39	35	22	52	26	44	50	62	73	4	12	38
56	23	47	39	52	27	24	18	165	4	12	41
14	4	25	9	9	10	17	22	49	4	12	10
2	30	37	16	36	24	35	37	146	4	12	21
71	74	63	57	67	59	69	46	127	4	12	67
31	13	41	45	28	12	40	56	151	4	12	23
3	1	6	4	3	3	6	25	58	4	12	*2
64	57	56	73	72	75	75	56	109	4	12	73

CADET-

Second class—

Order of annual merit.	Name.	State.	Date of admission.	Age at date of admission.	
				Years.	Months.
20	Anderson, Edwin Alexander	North Carolina	June 21, 1878	17	11
3	Arnold, John Thompson	Wyoming Territory	Sept. 27, 1877	17	10
39	Bell, Everett Nelson	Tennessee	Aug. 23, 1877	17	11
4	Bennett, Louis Slocum	New Jersey	Sept. 11, 1877	15	9
14	Blandin, John Joseph	Alabama	June 21, 1878	15	10
26	Conway, John Joseph	New York	Sept. 11, 1877	17	10
16	Doyle, James Gregory	Pennsylvania	June 21, 1877	17	1
31	Dudley, Charles Jackson	Georgia	Sept. 11, 1877	17	0
25	Duncan, William Butler	New York	Nov. 1, 1878	16	6
28	Eames, Harold Hayden	Maine	June 21, 1878	14	6
6	Field, Wiley Roy Mason	Virginia	June 21, 1878	15	8
7	Fletcher, William Bartlett	Vermont	Sept. 11, 1877	15	8
33	Fowler, Hammond	Virginia	Sept. 23, 1878	16	7
21	Grambs, William Jacob	Pennsylvania	Sept. 11, 1877	15	5
32	Gwyn, Lawrence Sangston	Mississippi	June 21, 1878	16	11
9	Horst, Henry August	Alabama	June 21, 1878	17	5
11	Howard, William Lauriston	Connecticut	Sept. 11, 1877	17	8
30	Hubbard, Nathaniel Mead	At large	Sept. 11, 1877	17	6
35	Jayne, Joseph Lee	Mississippi	June 21, 1878	15	1
8	Johnston, Marbury	Georgia	Sept. 23, 1878	17	9
12	Kenkel, Herman Henry	Minnesota	June 21, 1878	17	5
36	Kent, George Edward	New York	June 21, 1877	16	10
23	Key, Albert Lenoir	Tennessee	June 21, 1877	16	11
15	King, William Nephew, jr	Georgia	June 21, 1875	17	5
34	Lodeman, Frank Felix Emile	Michigan	June 21, 1878	14	4
24	Martin, Clarence	Louisiana	June 21, 1878	16	3
38	McGiffen, Philo Norton	Pennsylvania	Sept. 11, 1877	16	9
	McNutt, Finley Alexander	Indiana	Sept. 11, 1877	16	9
17	McWhorter, Jacob Gray	Georgia	Sept. 12, 1877	16	2
*1	**Nixon, Lewis**	Virginia	June 21, 1878	17	2
18	Paine, Walter Taylor	Ohio	Sept. 11, 1877	14	11
37	Patterson, Samuel Achmuty Wainwright	At large	June 21, 1876	16	6
27	Poyer, John Martin	At large	June 21, 1877	15	9
19	Prince, Thomes Clayton	Ohio	June 21, 1878	17	9
22	Savage, Ledru Rollin	Illinois	Sept. 23, 1878	17	2
10	Semple, Lorenzo	Alabama	Sept. 11, 1877	16	0
29	Stahle, Frederick Henry	California	Sept. 11, 1877	15	4
5	Sutphen, Edson Webster	Nebraska	June 21, 1878	17	9
13	Whittelsey, William Bailey	New York	June 21, 1878	17	11
2	Wood, Spencer Shepard	New York	June 21, 1878	16	10

MIDSHIPMEN.

40 *members.*

Order of merit in—									Sea-service in practice-ships.		
Seamanship.	Trigonometry.	Analytical geometry.	Descriptive geometry.	Physics and chemistry.	History and rhetoric.	French.	Drawing.	Number of demerits.	Months.	Days.	Order of annual merit.
27	28	18	12	11	11	17	22	144	4	9	20
34	3	2	1	2	23	29	8	225	4	9	3
30	45	32	38	44	15	47	25	185	4	9	39
22	7	13	15	3	2	4	20	154	4	9	4
22	29	20	20	12	5	10	18	227	4	9	14
22	30	28	37	40	7	14	30	154	4	9	26
11	22	14	18	8	17	37	16	176	4	9	16
15	27	31	13	40	39	31	42	201	4	9	31
8	33	26	23	18	45	1	34	253	4	9	25
3	26	38	20	25	32	21	7	250	4	9	28
22	9	3	10	16	9	8	39	156	4	9	6
5	12	11	7	7	3	20	11	78	4	9	7
35	48	35	41	36	29	23	29	221	4	9	33
22	19	16	25	20	28	31	4	235	4	9	21
33	47	11	40	28	37	23	48	158	4	9	32
11	12	21	26	4	13	2	19	104	4	9	9
17	10	24	14	34	19	3	10	138	4	9	11
31	34	25	28	32	25	27	23	250	4	9	30
6	24	17	6	14	25	40	15	253	4	9	35
19	5	4	9	6	15	15	26	174	4	9	8
4	4	23	5	13	37	36	3	153	4	9	12
32	32	38	16	37	40	40	6	214	4	9	36
39	21	10	30	19	11	25	41	240	4	9	23
10	15	30	22	27	10	7	16	248	1	23	15
36	46	33	42	38	43	18	33	236	4	9	34
40	10	22	36	28	24	11	44	124	4	9	24
14	40	40	44	31	34	34	47	174	4	9	38
....	16	....	....	....	....	....	36	85	4	9	
15	8	9	19	22	18	29	38	204	4	9	17
9	1	1	1	1	1	9	14	171	4	9	*1
43	18	6	32	25	31	6	32	102	4	9	18
28	36	37	30	32	36	42	37	230	4	9	37
42	16	29	33	24	5	16	45	262	4	9	27
13	25	27	7	10	21	19	11	75	4	9	19
37	23	15	16	20	20	26	40	96	4	9	22
21	19	7	29	14	13	4	21	190	4	9	10
37	31	35	35	30	25	12	28	237	4	9	29
1	5	8	3	16	7	28	1	107	4	9	5
6	14	18	10	9	22	39	13	96	4	9	13
2	2	5	4	5	4	13	2	47	4	9	2

CADET-

Third class—

Order of annual merit.	Name.	State.	Date of admission.
13	Agee, Alfred Pelham	Alabama	June 11, 1879
36	Alexander, Robert Colder	Kentucky	Sept. 22, 1879
‡	Ashby, Stephen	Kentucky	June 21, 1878
18	Balthis, Harry Hamilton	Illinois	June 11, 1879
†	Barkley, Richard Warren	Missouri	June 19, 1875
22	Barnard, John Hall	New York	Sept. 23, 1878
5	Bowman, William Ezekiel	Michigan	Sept. 22, 1879
14	Brady, Cyrus Townsend	Kansas	Sept. 22, 1879
43	Carpenter, James Franklin	Indiana	Sept. 12, 1878
21	Chapin, Frederick Lincoln	Illinois	Sept. 22, 1879
37	Colvin, Frank Reginald	New York	Sept. 22, 1879
33	Cooper, James Jackson Gignilliat	Florida	Sept. 22, 1879
19	Dalrymple, Elton Wesley	Iowa	June 21, 1878
39	Dovalé, Arthur	New York	Sept. 23, 1878
12	Frazier, Robert Thomas	Tennessee	Sept. 23, 1879
17	George, Harry	Michigan	June 11, 1879
6	Gignilliat, Thomas Heywood	Georgia	Sept. 23, 1878
30	Gray, Willie Theodore	North Carolina	May 8, 1878
*1	**Greene, Samuel Dana, jr**	Rhode Island	June 18, 1879
‡	Hayden, Thomas Warren	Massachusetts	Sept. 11, 1877
9	Hepp, Charles Frederick	Missouri	June 21, 1878
23	Jackson, John Alexander	Florida	Sept. 22, 1879
*3	**Jackson, John Brinckerhoff**	New Jersey	Sept. 22, 1879
15	Keith, Albion Sherman	Massachusetts	Sept. 22, 1879
7	Kiefer, Edmund Emerson	Pennsylvania	June 11, 1879
45	Ledbetter, William Hamilton	Texas	Sept. 22, 1879
24	Legaré, Alexander Brown	South Carolina	Mar. 20, 1878
20	Lennon, Michael Edward	Wisconsin	Sept. 22, 1879
35	Lerch, Robert Lee	Ohio	Sept. 22, 1879
16	Mègrath, William Alonzo	Georgia	Sept. 22, 1879
29	Mitchell, Sidney Zollicoffer	Alabama	Sept. 23, 1878
‡	Morris, Walter Ellis	Pennsylvania	June 20, 1877
31	O'Leary, Timothy Stephen	Massachusetts	Sept. 22, 1879
46	Parker, Foxhall Alexander	Iowa	Sept. 22, 1879
42	Pettit, Harry Corbin	Indiana	Sept. 22, 1879
11	Philbin, Patrick Henry	Maryland	June 21, 1878
§	Phythian, Charles Taylor	Kentucky	June 19, 1877
32	Reynolds, Charles Roberts	Arizona Territory	June 21, 1878
33	Ricketts, William Wallace	Virginia	Sept. 23, 1878
‡	Schrader, George Morrison von	Missouri	Sept. 23, 1878
41	Smith, Thomas Buchanan	Alabama	June 21, 1878
‡	Smythe, James Wilson	New York	June 19, 1877
44	Solomon, Edward Everett	Georgia	Sept. 17, 1878
25	Stout, George Clymer	Pennsylvania	Sept. 22, 1879
*2	**Street, George Washington**	Wisconsin	Sept. 22, 1879

†Reinstated in accordance with an act of Congress.

‡Turned back from present second class.

MIDSHIPMEN.

53 *members*.

Age at date of admission.		Order of merit in—					Number of demerits.	Sea-service in practice-ships.		Order of annual merit.
Years.	Months.	Seamanship.	Mathematics.	English and history.	French.	Drawing.		Months.	Days.	
16	10	13	9	14	33	40	136	2	12	13
16	21	49	38	29	34	4	70	2	12	36
16	8	....	....	....	....	....	....	....	....	‡
17	8	13	21	12	35	20	96	2	12	18
16	3	....	....	....	....	....	....	....	....	†
17	2	5	27	35	11	2	191	2	12	22
16	3	7	5	4	4	15	91	2	12	5
17	9	29	17	6	6	18	275	2	12	14
15	7	39	48	35	46	34	145	2	12	43
16	3	21	32	32	18	6	60	2	12	21
17	2	53	38	18	26	45	97	2	12	37
16	7	37	30	14	40	43	178	2	12	33
16	4	36	12	25	22	30	196	2	12	19
17	10	52	37	47	7	34	184	2	12	39
16	4	10	15	7	10	34	106	2	12	12
16	1	21	18	9	24	27	145	2	12	17
15	7	6	6	21	28	1	120	2	12	6
18	0	17	27	33	21	20	121	2	12	30
14	7	1	2	1	1	20	70	2	12	*1
16	8	....	....	....	....	....	....	....	....	‡
17	2	8	22	10	11	3	48	2	12	9
17	11	18	29	11	20	37	158	2	12	23
17	1	4	4	2	2	11	48	2	12	*3
16	5	21	14	22	22	7	78	2	12	15
16	4	32	7	24	17	31	129	2	12	7
17	8	55	46	41	29	52	126	2	12	45
18	0	42	19	38	24	12	144	2	12	24
16	10	33	23	7	46	31	105	2	12	20
16	3	30	38	27	9	33	36	2	12	35
17	4	18	8	31	37	28	121	2	12	16
16	6	27	24	30	8	37	181	2	12	29
16	6	....	....	....	....	....	....	....	....	‡
18	0	21	35	32	16	15	91	2	12	31
17	3	47	47	46	52	58	161	2	12	46
15	10	45	43	40	55	29	131	2	12	42
17	8	25	11	20	18	10	153	2	12	11
16	8	....	....	....	....	....	....	....	....	§
15	6	41	25	43	32	14	72	2	12	32
17	10	34	20	42	44	40	72	2	12	33
16	5	....	....	....	....	....	....	....	....	‡
17	8	43	43	33	37	56	299	2	12	41
16	5	....	....	....	....	....	....	....	....	‡
18	0	53	36	37	54	57	232	2	12	44
17	2	27	31	19	35	9	83	2	12	25
16	7	2	1	3	11	25	76	2	12	*2

§ Reinstated.

CADET-

Third class—53

Order of annual merit.	Name.	State.	Date of admission.
*4	**Sweeting, Charles Edward**	New York	Sept. 22, 1879
38	Temple, Edwin George	Wisconsin	Sept. 22, 1879
10	Thurston, Benjamin Eaton	Indiana	Sept. 22, 1879
28	Toney, Tremlet Vivian	Illinois	June 11, 1879
27	Weeks, Edwin Babbitt	Oregon	Sept. 23, 1878
40	Wilson, William Joseph	Ohio	Sept. 22, 1879
25	Witherspoon, Thomas Alfred	Tennessee	June 11, 1879
8	Woods, Robert Harris	Virginia	Sept. 23, 1878

MIDSHIPMEN.

members—Continued.

Age at date of admission.		Order of merit in—					Number of demerits.	Sea-service in practice-ships.		Order of annual merit.
Years.	Months.	Seamanship.	Mathematics.	English and history.	French.	Drawing.		Months.	Days.	
17	11	9	3	5	15	8	185	2	12	*4
17	8	46	42	14	43	48	52	2	12	38
15	5	30	10	27	5	4	46	2	12	10
17	8	12	33	17	37	25	110	2	12	28
15	3	16	15	39	11	40	252	2	12	27
17	11	39	38	48	44	44	54	2	12	40
17	2	3	26	26	41	23	76	2	12	25
17	10	10	13	13	2	17	64	2	12	8

CADET-MIDSHIPMEN.

Fourth class—51 members.

Name.	State.	Date of admission.	Age at date of admission.		Sea-service in practice-ships.	
			Years.	Months.	Months.	Days.
Atwood, John Cowan	Missouri	June 11, 1880	17	0	1	23
Barker, William Alfred	Colorado	Sept. 22, 1880	16	6	0	0
Beecher, Albert Morrison	Iowa	June 11, 1880	17	4	1	23
Blake, Henry Davis	North Carolina	Sept. 20, 1880	18	0	0	0
Bush, William Wirt, jr	New York	Sept. 22, 1880	15	8	0	0
Carter, Vaulx	Pennsylvania	Sept. 22, 1880	17	1	0	0
Cassidy, Edward Rochfort	New York	Sept. 12, 1879	17	11	0	0
Cook, William Ellsworth	Ohio	Sept. 30, 1880	18	0	0	0
Curtis, Frederic Ellsworth	Massachusetts	Sept. 22, 1880	17	8	0	0
Davis, James Sherlock	Ohio	June 11, 1880	17	9	1	23
Friedlander, Harry	California	Sept. 22, 1880	17	11	0	0
Ganong, William Gilbert	Wisconsin	Mar. 29, 1880	18	0	1	23
Gilmer, William Wirt	Virginia	June 11, 1880	17	0	1	23
Harrell, John Randolph	Louisiana	Sept. 22, 1880	16	7	0	0
Hayes, Charles Harold	Pennsylvania	Sept. 22, 1880	16	8	0	0
Hazeltine, Charles Walter	Missouri	June 11, 1880	17	2	1	23
Hoggatt, Wilford Bacon	Indiana	June 11, 1880	14	9	1	23
Jastremski, Leon Henry	Louisiana	Sept. 22, 1879	14	11	1	23
Jones, Hilary Pollard, jr	Virginia	Sept. 22, 1880	16	10	0	0
Johnston, William	Mississippi	June 11, 1880	17	10	1	23
Lamison, Jason Gordon	Ohio	June 11, 1880	16	5	1	23
Leary, Thomas Horton	North Carolina	Sept. 22, 1880	16	11	0	0
Lovenskiold, Arlington Lee	Texas	Sept. 29, 1880	17	10	0	0
McCook, John Anson	New York	Sept. 30, 1880	17	2	0	0
McCord, Harry Herrick	New York	June 11, 1880	15	5	1	23
McCreary, Wirt	Pennsylvania	June 11, 1879	17	1	0	0
McDonald, John Daniel	Nevada	Oct. 6, 1880	16	11	0	0
McIntire, Alonzo Evans	Massachusetts	Sept. 22, 1879	15	0	1	23
McKean, Josiah Slutts	Ohio	Sept. 22, 1879	15	3	0	0
McNulta, Herbert	Illinois	June 11, 1880	17	6	1	23
Macpherson, Victor	Kentucky	Sept. 22, 1880	15	3	0	0
Maxcy, John Wharton	Texas	June 11, 1880	16	5	1	23
Mitchell, Charles Ryan	Georgia	Sept. 22, 1879	17	9	0	0
Moseley, Nathaniel Stockwell	California	Mar. 22, 1880	18	......	1	23
O'Malley, William Ambrose	Pennsylvania	Sept. 22, 1880	17	4	0	0
Plunkett, Charles Peshall	Dist. of Columbia	Sept. 30, 1879	15	7	0	0
Raichle, Frank Godfrey	New York	June 11, 1880	16	11	1	23
Sargent, Frederic Homer	Illinois	June 11, 1880	17	6	1	23
Seymour, Isaac Knight	Maine	Sept. 22, 1880	17	6	0	0
Shoemaker, William Rawle	New Mexico	June 11, 1880	17	4	1	23
Sloan, Albert Brown	Missouri	Sept. 22, 1880	17	8	0	0
Smith, Sidney Fuller	Massachusetts	Sept. 22, 1880	16	11	0	0
Sparling, Frederick Herbert	Washington Ter	Dec. 29, 1879	18	......	1	23
Stevens, Raymond Rodgers Watmough Bliss	Kentucky	Nov. 18, 1879	18	0	1	23

CADET-MIDSHIPMEN.

Fourth class—51 *members*—Continued.

Name.	State.	Date of admission.	Age at date of admission.		Sea-service in practice-ships.	
			Years.	Months.	Months.	Days.
Terrell, Douglass Fuqua	Mississippi	Sept. 22, 1880	17	3	0	0
Venable, Charles	Georgia	Sept. 22, 1880	17	0	0	0
Welles, Roger, jr	Connecticut	Sept. 22, 1880	17	9	0	0
Williams, Clarence Stewart	Ohio	Sept. 22, 1880	16	11	0	0
Williams, William Plumb	Connecticut	June 11, 1880	17	11	1	23
Wirt, William Edgar	Ohio	Sept. 22, 1880	17	9	0	0
Wood, John Whitaker	North Carolina	Sept. 22, 1880	16	11	0	0

CADET-

Graduating class of

Order of general merit.	Name.	State.	Date of admission.	Age at date of admission.	
				Years.	Months.
*1	**Stahl, Albert William**	New York	Sept. 14, 1876	19	4
*2	**Durand, William Frederick**	Connecticut	Sept. 14, 1876	17	6
3	Hasson, William Frederick Converse	Ohio	Sept. 14, 1876	19	4
4	Miner, Leo Dwight	Ohio	Sept. 14, 1876	17	7
5	Sample, Winfield Scott	Pennsylvania	Sept. 14, 1876	18	10
6	Woods, Arthur Tannatt	Massachusetts	Sept. 14, 1876	17	7
7	Wood, Joseph Learned	Virginia	Sept. 14, 1876	20	2
8	Manning, Charles Edward	New York	Sept. 14, 1876	17	6
9	Hall, Harry	Pennsylvania	Sept. 14, 1876	17	9
10	Allderdice, William Hillary	Pennsylvania	Sept. 14, 1876	16	9
11	Young, Albert Osborn	New York	Sept. 14, 1876	19	2
12	Smith, Albert Edward	Wisconsin	Sept. 14, 1876	17	8
13	King, Charles Alfred	Maryland	Sept. 14, 1876	18	1
14	Kinkaid, Thomas Wright	Ohio	Sept. 14, 1876	16	6
15	Weaver, William Dixon	Pennsylvania	Sept. 14, 1876	19	1
16	Worthington, John Leeds	Maryland	Sept. 14, 1876	18	3
17	Smith, William Strother	Virginia	Sept. 15, 1875	18	0

ENGINEERS.

1880—17 *members.*

Order of merit in—										Number of demerits.	Sea-service in practice-ships.		Order of general merit.
Ship-building.	Steam-engineering.		Heat and light.	Physical measurements.	Mechanics.	Naval architecture and method of least squares.	Naval architecture (elective).	Public law.	Spanish.				
	Mechanical drawing and fabrication.	Designing machinery and marine engines.									Months.	Days.	
4	1	1	1	2	2	2	2	1	2	95	7	25	*1
1	3	1	2	6	1	1	1	2	1	80	5	4	*2
7	7	8	3	1	7	4	4	5	8	153	5	4	3
3	8	7	4	2	6	3	5	10	17	54	7	19	4
6	6	3	5	8	4	5	3	11	5	45	5	4	5
10	2	4	10	13	8	5	5	14	8	111	7	25	6
12	10	11	8	1	5	14	9	3	3	94	5	4	7
4	5	5	11	15	9	18	....	15	13	55	7	19	8
2	18	5	7	14	3	7	5	7	7	38	5	4	9
11	11	14	15	12	12	8	8	11	11	217	5	4	10
16	9	12	14	2	10	13	....	13	12	55	5	4	11
9	4	8	13	9	15	9	....	9	16	124	7	25	12
8	13	10	9	9	10	10	9	4	5	108	5	4	13
13	14	15	6	7	16	11	....	8	18	103	5	4	14
18	11	13	12	17	14	16	....	6	8	163	5	4	15
15	17	16	18	18	16	15	....	18	4	51	5	4	16
17	15	16	17	15	18	17	....	17	14	118	5	6	17

CADET-

First class—

Order of annual merit.	Name.	State.	Date of admission.	Age at date of admission.	
				Years.	Months.
20	Anderson, Martin Augustus	Wisconsin	Sept. 13, 1877	19	11
21	Arnold, Solon	Maryland	Sept. 14, 1876	22	2
10	Bankson, Lloyd	Pennsylvania	Sept. 13, 1877	19	9
19	Beach, Robert James	New York	Sept. 13, 1877	19	10
4	Belden, Charles Emery	Ohio	Sept. 14, 1876	18	6
18	Bush, Arthur Richmond	Massachusetts	Sept. 13, 1877	17	4
5	Byrne, James Edwin	Massachusetts	Sept. 14, 1876	19	5
8	Dowst, Frank Butland	Massachusetts	Sept. 13, 1877	18	3
22	Gartley, William Henry	Pennsylvania	Sept. 13, 1877	18	1
11	Hogan, Thomas Joseph	Georgia	Oct. 1, 1874	18	10
2	Kaemmerling, Gustave	Indiana	Sept. 13, 1877	19	3
	Lang, William	New York	Sept. 14, 1876	18	8
‡	Mathews, Clarence Herbert	Ohio	Sept. 14, 1876	19	7
6	McAlpine, Kenneth	Virginia	Sept. 13, 1877	17	0
23	Moritz, Albert	New York	Sept. 13, 1877	17	2
14	Parsons, Isaac Brown	Michigan	Sept. 13, 1877	17	8
16	Perkins, Lyman Burnham	Connecticut	Sept. 13, 1877	18	7
7	Redgrave, De Witt Clinton	Maryland	Sept. 13, 1877	19	2
17	Sampson, Bias Clay	Illinois	Sept. 13, 1877	19	6
3	Shallenberger, Oliver Blackburn	Pennsylvania	Sept. 13, 1877	17	4
13	Smith, William Stuart	New York	Sept. 13, 1877	19	8
15	Stewart, Robert, jr	Michigan	Sept. 13, 1877	19	5
9	Webster, William Townsend	New York	Sept. 13, 1877	20	1
12	White, William Wilmot	Pennsylvania	Sept. 13, 1877	17	11
1	Whitham, Jay Manuel	Illinois	Sept. 13, 1877	19	0

‡ Turned back from

ENGINEERS.

25 members.

Steam-engineering.			Order of merit in—					Number of demerits.	Sea-service in practice-ships.		Order of annual merit.
Mechanical drawing.	Fabrication of machinery.	Designing machinery.	Astronomy.	Heat and light.	Mechanics and applied mathematics.	Composition.	French.		Months.	Days.	
4	9	7	19	26	16	16	6	129	5	15	20
26	23	22	16	22	23	9	5	128	5	15	21
20	14	6	15	8	5	20	21	83	5	15	10
16	12	21	25	23	23	18	25	195	5	8	19
11	16	13	8	4	4	21	8	51	5	3	4
14	10	17	23	14	15	27	17	199	5	8	18
12	7	11	7	7	5	17	13	157	5	8	5
13	14	9	12	9	13	4	4	111	5	8	8
23	18	24	24	24	12	14	20	181	5	15	22
1	2	19	5	21	11	21	10	157	5	6	11
9	11	5	3	6	2	11	9	89	5	15	2
....	....	....	....	....	....	....	....	....	......	......	
....	....	....	....	....	....	....	....	....	......	......	÷
25	13	15	14	13	3	10	2	174	5	15	6
19	25	23	22	17	23	21	12	124	5	8	23
3	8	8	18	20	17	14	26	185	5	15	14
7	22	17	17	14	18	24	16	167	5	8	16
8	20	4	13	9	9	1	15	81	5	15	7
18	19	13	10	18	19	26	23	104	5	15	17
5	1	2	1	5	7	4	11	140	5	15	3
17	17	12	11	3	21	19	24	75	5	15	13
27	24	20	6	16	20	2	7	68	5	0	15
10	2	9	8	9	14	12	14	117	5	8	9
15	20	15	20	12	7	13	17	120	5	15	12
2	4	1	4	1	1	25	22	59	5	15	1

the graduating class.

CADET-

Second class—

Order of annual merit.	Name.	State.	Date of admission.	Age at date of admission.	
				Years.	Months.
21	Addicks, Walter Robarts	Pennsylvania	Oct. 1, 1878	17	5
7	Chambers, William Henry	Pennsylvania	Oct. 1, 1878	19	11
10	Clarke, Arthur Henry	Rhode Island	Oct. 1, 1878	18	1
23	Coley, Frederick Edward	New York	Oct. 1, 1878	16	8
9	Conant, Frank Henry	Massachusetts	Oct. 1, 1878	19	5
*3	**Creighton, William Henry Paul**	Ohio	Oct. 1, 1878	19	2
12	Day, Willis Bunner	Ohio	Sept. 13, 1877	19	10
‡	Eckel, Herman	Ohio	Sept. 14, 1876	20	2
*4	**Ferguson, George Robert**	Connecticut	Oct. 1, 1878	19	3
6	Fitts, James Henry	Virginia	Oct. 1, 1878	17	7
*2	**Gatewood, Robert Woodland**	Virginia	Oct. 1, 1878	16	9
20	Gladstone, Daniel Demarest	New Jersey	Sept. 13, 1877	18	1
13	Gsantner, Otto Charles	New Jersey	Oct. 1, 1878	19	0
11	Hawthorne, Harry Leroy	Kentucky	Oct. 1, 1878	19	9
17	Higgins, Robert Barnard	Maryland	Oct. 1, 1878	20	0
19	Howland, Charles Henry	Rhode Island	Oct. 1, 1878	17	5
16	Leonard, John Calvin	Ohio	Oct. 1, 1878	19	3
22	Leopold, Harry Girard	Ohio	Oct. 1, 1878	19	6
5	Miller, Peter	Kansas	Oct. 1, 1878	18	7
‡	McAllister, Andrew	New York	Sept. 13, 1877	19	3
15	Pendleton, Joseph Henry	Pennsylvania	Oct. 1, 1878	18	3
8	Rommell, Charles Edward	Pennsylvania	Oct. 1, 1878	16	2
25	Shock, Thomas Alexander Wharton	Maryland	Oct. 1, 1878	18	4
	Simpson, Henry Lakin	Pennsylvania	Oct. 1, 1878	17	3
24	Taylor, Edward Kenyon	Massachusetts	Oct. 1, 1878	18	8
*1	**Theiss, Emil**	Wisconsin	Oct. 1, 1878	17	11
14	Willis, Clarence Calhoun	Mississippi	Oct. 1, 1878	19	0
18	Winchell, Ward Philo	Ohio	Oct. 1, 1878	19	5
26	Youchi, Sadanori	Japan	Sept. 21, 1878	19	11

‡ Turned back.

ENGINEERS.

29 *members.*

Order of merit in—							Number of demerits.	Sea-service in practice-ships.		Order of annual merit.
Trigonometry.	Analytical geometry.	Descriptive geometry.	Mechanical drawing and fabrication of machinery.	Physics and chemistry.	History and rhetoric.	French.		Months.	Days.	
22	22	17	13	22	15	24	243	5	1	21
7	8	4	5	5	3	9	81	5	1	7
8	11	12	26	11	6	7	158	5	1	10
23	24	26	19	24	25	20	242	5	1	23
12	16	11	6	7	11	8	108	5	1	9
3	5	6	11	9	2	4	75	5	1	*3
11	12	13	10	14	17	18	94	5	15	12
....	....	....	....	....	....	....	....	5	1	‡
4	6	2	1	4	13	14	37	5	1	*4
6	4	8	9	6	7	3	191	5	1	6
2	1	2	18	2	5	2	231	5	1	*2
20	19	19	20	21	18	20	223	5	1	20
15	13	14	3	11	20	5	202	5	1	13
10	15	9	12	15	9	22	136	5	1	11
18	16	10	8	16	19	15	136	5	1	17
13	25	24	20	20	14	13	153	5	1	19
17	9	16	27	16	12	19	110	5	1	16
23	18	22	15	13	23	25	233	5	1	22
5	3	7	14	3	3	6	194	5	1	5
....	....	....	....	....	....	....	....	5	1	‡
14	14	18	25	8	16	16	217	5	1	15
8	7	5	7	18	7	11	67	5	1	8
27	23	27	28	26	24	26	77	5	1	25
23	....	....	20	....	....	....	158	2	16	
18	26	23	23	22	22	23	90	5	1	24
1	2	1	4	1	1	1	174	5	1	*1
16	9	20	24	10	10	12	212	5	1	14
20	20	15	2	19	21	16	172	5	1	18
28	27	20	15	27	27	....	13	5	1	26

from first class.

CADET-ENGINEERS.

Third class—24 members.

Order of annual merit.	Name.	State.	Date of admission.	Age at date of admission.		Order of merit in—				Number of demerits.	Sea-service in practice-ships.	
				Years.	Months.	Mathematics.	Mechanical drawing.	English and history.	French.		Months.	Days.
11	Aldrich, William Sleeper	N. J.	Oct. 1, 1879	16	6	9	1	20	16	23	1	12
*2	**Armistead, Samuel Wilson**	Va.	Oct. 1, 1879	18	0	2	2	4	5	36	1	12
6	Barnes, Charles Edwin	N. J.	Oct. 1, 1879	17	8	6	7	2	8	68	1	12
*3	**Baxter, William Joseph**	Ohio	Oct. 1, 1879	20	11	4	4	1	6	41	1	12
15	Carswell, William Beggs	Del.	Oct. 1, 1879	18	10	16	16	12	17	98	1	12
7	Darrah, William Francis	R. I.	Oct. 1, 1879	17	1	7	9	8	3	64	1	0
24	Duvall, Marius, jr.	Md.	Oct. 1, 1879	20	3	24	17	23	24	253	1	12
8	Dyson, Charles Wilson	Penn.	Oct. 1, 1879	17	9	8	13	10	13	64	1	12
*5	**Eaton, Charles Phillips**	Wis.	Oct. 1, 1879	16	4	4	9	7	1	47	1	12
19	Ellenger, Julius	Md.	Oct. 1, 1879	16	11	19	22	14	23	186	1	12
*4	**Ellicott, John Morris**	Md.	Oct. 1, 1879	20	0	3	4	5	2	51	1	12
13	Field, Harry Ashby	Va.	Oct. 1, 1879	17	2	12	18	15	14	11	1	12
17	Gillis, Harry Alexander	Penn.	Oct. 1, 1879	17	9	21	18	17	10	117	1	12
22	Glascock, Eustace Straughn	Md.	Oct. 1, 1879	16	6	22	24	16	21	128	1	12
14	Gross, Charles Jacob	Md.	Oct. 1, 1879	17	11	14	6	17	7	74	1	12
12	Halstead, Alexander Seaman	Penn.	Oct. 1, 1879	17	9	11	14	11	9	82	1	12
20	Herbert, William Cromwell	Penn.	Oct. 1, 1879	15	6	17	23	21	15	162	1	12
23	Lawrance, William Hunter	Penn.	Oct. 1, 1879	20	11	23	12	22	21	82	1	12
10	Littlehales, George Washington	Penn.	Oct. 1, 1879	18	11	13	15	5	11	41	1	12
21	Palmer, James Edward	N. C.	Oct. 1, 1879	18	3	20	11	24	20	64	1	12
18	Ryan, Philip Joseph	N. Y.	Oct. 1, 1879	19	11	17	21	19	19	193	1	12
16	Webster, Charles Franklin	Penn.	Oct. 1, 1879	17	8	14	20	13	17	163	1	12
*1	**Woodruff, Charles Edward**	Penn.	Oct. 1, 1879	18	11	1	3	3	4	65	1	12
9	Zinnell, George Frederick	Penn.	Oct. 1, 1879	17	11	10	8	9	12	49	1	12

CADET-ENGINEERS.

Fourth class—26 members.

Name.	State.	Date of admission.	Age at date of admission.		Relative standing as determined at examination for appointment.
			Years.	Months.	
Baron, Charles Christopher	Massachusetts	Oct. 1, 1880	19	0	2
Biddle, Andrew Porter	Michigan	Oct. 1, 1880	18	7	9
Capps, Washington Lee	Virginia	Oct. 1, 1880	16	8	19
Crisp, Richard Owens	Maryland	Oct. 1, 1880	18	9	6
Dargan, Milton	South Carolina	Oct. 1, 1880	18	7	24
Davis, Edward	Pennsylvania	Oct. 1, 1880	20	8	12
Fahs, Charles Marion	Alabama	Oct. 1, 1880	17	9	10
Field, Horace Almeron	New York	Oct. 1, 1880	19	3	3
Hewes, Charles Hinman	Pennsylvania	Oct. 1, 1880	16	4	8
Hill, Frank Kinsey	Ohio	Oct. 1, 1880	19	6	26
Hughes, Arthur Lewis	Ohio	Oct. 1, 1880	19	9	20
Hulme, Walter Oliphant	New Jersey	Oct. 1, 1880	20	10	18
Jones, Horace W	Virginia	Oct. 1, 1880	19	1	22
Keilholtz, Pierre Otis	Maryland	Oct. 1, 1880	18	5	7
Knepper, Chester Mahlon	Pennsylvania	Oct. 1, 1880	18	9	17
Loomis, Frederic James	Connecticut	Oct. 1, 1880	18	0	13
McCay, Henry Kent	Georgia	Oct. 1, 1880	20	5	23
Mathews, Albert Clifton	Ohio	Oct. 1, 1880	18	10	16
Orr, Robert Hunter	Delaware	Oct. 1, 1880	20	0	5
Parmenter, Henry Earl	Rhode Island	Oct. 1, 1880	19	6	4
Pattison, Thomas Putnam	Maryland	Oct. 1, 1879	19	6	7
Richardson, Thornton Russell	Pennsylvania	Oct. 1, 1880	20	1	11
Starr, John Burton	Kansas	Oct. 1, 1880	19	2	15
Wedderburn, Lawrence Alexander	Virginia	Oct. 1, 1880	18	0	1
Werntz, Robert Lincoln	Pennsylvania	Oct. 1, 1880	19	4	14
Whittlesey, Humes Houston	Indiana	Oct. 1, 1880	19	1	21

SUMMARY.

November 1, 1880.

CADET-MIDSHIPMEN.

First class	77 members.	
Second class	40 members.	
Third class	53 members.	
Fourth class	51 members.	
	——	221

CADET-ENGINEERS.

First class	25 members.	
Second class	29 members.	
Third class	25 members.	
Fourth class	26 members.	
	——	105
Total		326

DEATHS, RESIGNATIONS, AND DISMISSALS.

November 16, 1879 *to November* 1, 1880.

DIED.

Cadet-Midshipman John M. Moore	Boonville, Ind., November 16, 1879
Cadet-Engineer Llewellyn F. Whittle	Naval Hospital, Philadelphia, July 23, 1880

DISMISSED.

Cadet-Midshipman Smith Salisbury	Jan. 5, 1880

RESIGNED.

Cadet-Midshipman William Y. Slack	Dec. 11, 1879
Cadet-Midshipman Sidney H. Dent	Mar. 13, 1880
Cadet-Midshipman John K. Morris	Mar. 27, 1880
Cadet-Midshipman John R. Miner	April 3, 1880
Cadet-Midshipman Robert B. Blake	April 10, 1880
Cadet-Midshipman Samuel E. Belford	April 12, 1880
Cadet-Midshipman Louis M. Wentworth	July 7, 1880
Cadet-Midshipman Oliver D. Norton	Sept. 22, 1880
Cadet-Midshipman Harlen Pefley	Oct. 18, 1880

DROPPED.

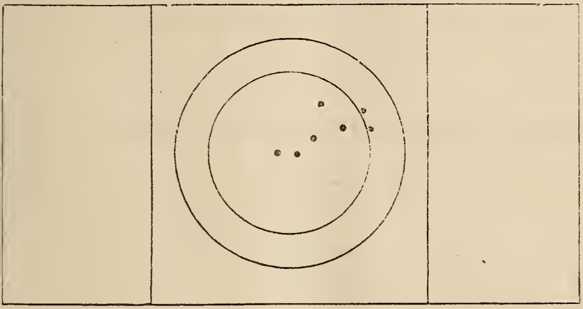
Cadet-Midshipman William P. Hoke	July 7, 1880
Cadet-Midshipman James A. Lamkin	July 7, 1880
Cadet-Midshipman Arlington L. Lovenskiold	July 7, 1880
Cadet-Midshipman John A. McCook	July 7, 1880
Cadet-Midshipman Harry Rankin	July 7, 1880

WITHDRAWN.

Japanese Student Yenoske Enouye	Aug. 20, 1880

ANNUAL RIFLE-MATCH

CLASS OF 1880.



Target showing score of W. H. Emerson.

TERMS OF THE MATCH.

arget, that adopted by the National Rifle Association of 1875.
istance, 400 yards.
ifle, Navy, Hotchkiss magazine.
Position, that of a skirmisher lying down
Number of shots, 7.
Possible score, 35.

Name.	1.	2.	3.	4.	5.	6.	7.	Total.
V. H. Emerson	5	4	5	5	5	4	5	33
. B. Bernadou	4	4	5	5	5	5	5	33
I. G. Dresel	4	4	5	4	5	4	5	31
. S. Watters	5	5	3	4	4	4	5	30
. R. Wall	4	4	5	5	4	4	4	30
Total	....	....	....	....	....	....	....	157

verage score of class 21.5

SUMMER CRUISE, 1880.

OFFICERS AND CADET-MIDSHIPMEN

ATTACHED TO THE

UNITED STATES PRACTICE-SHIP CONSTELLATION.

Commander E. M. SHEPARD, *Commanding.*
Lieutenant J. C. SOLEY, *Executive Officer.*
Lieutenant C. BELKNAP, *Navigator.*
Lieutenant C. A. STONE, *Watch Officer.*
Lieutenant R. P. RODGERS, *Instructor in Navigation*
Lieutenant G. W. TYLER, *Watch Officer.*
Master C. P. REES, *Watch Officer.*
Master C. H. LYMAN, *Watch Officer.*
Master C. R. MILES, *Watch Officer.*
Passed Assistant Surgeon C. U. GRAVATT.
Passed Assistant Surgeon C. T. HIBBETT.
Paymaster A. BURTIS.
Chaplain J. S. WALLACE.

CADET-MIDSHIPMEN.

First class (76).

Andrews, H. B.
Ballentine, H. L.
Barnett, G.
Blow, G. P.
Bonfils, T. L.
Bryan, S.
Buck, G. M.
Bunts, F. E.
Capehart, E. E.
Carroll, E.
Clark, G.
Cockle, R. R.
Cohen, H. R.
Colwell, J. H.
Craven, M.
Craig, B. H.
Crenshaw, J. D.
Dashiell, R. B.
Donnelly, M. J.
Doyen, C. A.
Dresser, J. W.
Eldredge, H.
Emmett, W. Le R.
Enouye, Y.
Flournoy, W. F.
Ford, W. G.
Forshew, R. P.
George, C. P.
Gresham, W. A.
Haines, H. C.
Hains, R. P.
Harmon, E. M.
Harrison, E. H.
Hasson, A. R.
Hoogewerf, J. A.
Hunicke, F. H.
Karmany, L.
Kase, S. M.
Kimball, J. A.
Lauchheimer, C. H.
Linnard, J. H.
McCrea, A. S.
McJunkin, I.
McKee, L. P.
Mahoney, J. E.
Matthews, T. H.
Moses, F. J.
Oliphant, A. C.
Orlopp, M. A.
Parker, F.
Parsons, A. C.
Perkins, C. M.
Perry, G. E.
Pierce, B. G.
Printup, D. L.
Rees, J. L.
Rider, F. C.
Robinson, W. M.
Rodgers, G. G.
Russell, W. W.
Schock, J. L.
Serata, T.
Smies, F. W.
Stayton, W. H.
Stewart, C. W.
Sutton, F. E.
Uriu, S.
Vance, Z. B.
Weeks, J. W.
Weller, O. E.
White, H. K.
Wilkes, G.
Williamson, S. H.
Wilson, H. B.
Woodward, J. J.
Wright, S. H.

Third class (48).

Agee, S. P.
Alexander, R. C.
Balthis, H. H.
Barnard, J. H.
Bowman, W. E.
Brady, C. T.
Carpenter, J. F.
Chapin, F. L.
Colvin, F. R.
Cooper, J. J. G.
Dalrymple, E. W.
Dovale, A.
Frazier, R. T.
George, H.
Gignilliat, T. H.
Gray, W. T.
Greene, S. D., jr.
Hepp, C. F.
Jackson, J. A.
Jackson, J. B.
Keith, A. G.
Keifer, E. E.
Ledbetter, W. H.
Legare, A. B.
Lennon, W. E.
Lerch, R. E.
McKean, J. S.
Megrath, W. A.
Mitchell, S. Z.
O'Leary, T. S.
Parker, F. A.
Petit, H. C.
Philbin, P. H.
Plunket, C. P.
Reynolds, C. R.
Ricketts, W. W.
Smith, T. B.
Solomon, E. E.
Stout, G. C.
Sweeting, C. W.
Street, G. W.
Temple, E. G.
Thurston, B. E.
Toney, T. V.
Weeks, E. B.
Wilson, W. J.
Witherspoon, T. A.
Woods, R. H.

The Constellation sailed from Annapolis June 18, and arrived at the navy-yard, New York, June 25; from thence she proceeded on her practice-cruise, touching at Portland, Newport, Nahant, and New London. She sailed from New London August 20, and arrived off the Naval Academy August 28.

UNITED STATES PRACTICE-SHIP DALE.

Lieutenant-Commander E. WHITE, *Commanding.*
Lieutenant E. DE F. HEALD, *Executive Officer.*
Lieutenant J. V. B. BLEECKER.
Lieutenant A. B. SPEYERS.
Paymaster L. A. FRAILEY.
Passed Assistant Surgeon G. P. LUMSDEN.

CADET-MIDSHIPMEN.

Second class (42).

Anderson, E. A.
Arnold, J. T.
Bennett, L. S.
Blandin, J. J.
Conway, J. J.
Doyle, J. G.
Dudley, C. J.
Duncan, W. B.
Eames, H. H.
Field, W. R. M.
Fletcher, W. B.
Fowler, H.
Grambs, W. J.
Gwyn, L. S.
Horst, H. A.
Howard, W. L.
Hubbard, N. M.
Jayne, J. L.
Johnson, M.
Kenkel, H. H.
Kent, G. E.
Key, A. L.
King, W. N.
Lodeman, F. F. F.
McGiffin, P. N.
McWhorter, J. G.
Martin, C.
Morgan, D.
Morris, W. E.
Nixon, L.
Norton, O. D.
Paine, W. T.
Patterson, S. A. W.
Poyer, J. M.
Prince, T. C.
Savage, L. R.
Semple, L.
Smythe, J. W.
Stahle, F. H.
Sutphen, E. W.
Whittelsey, W. B.
Wood, S. S.

Fourth class (21).

Atwood, J. C.
Beecher, A. N.
Davis, J. G.
Ganong, W. G.
Gilmer, W. W.
Hazelton, C. W.
Hoggatt, W.
Jastremski, L. H.
Johnson, W.
Lamison, J. G.
McCord, H. H.
McIntire, A. E.
McNulta, H.
Maxcy, J. W.
Moseley, N. S.
Raichle, F. G.
Sargent, T. H.
Shoemaker, W. R.
Sparling, T. H.
Stevens, R. R.
Williams, W. P.

Third class (1).

Phythian, C. T.

The Dale sailed from Annapolis June 19, and cruised in Chesapeake Bay as far as Hampton Roads, and in the York, Patuxent, and Potomac Rivers, returning to the Naval Academy August 6.

UNITED STATES PRACTICE-STEAMER DESPATCH.

Lieutenant-Commander F. A. COOK, *Commanding.*
Lieutenant W. H. PARKER, *Executive Officer.*
Lieutenant R. RUSH, *Navigator.*
Surgeon M. L. RUTH.
Assistant Paymaster H. R. SMITH.
Passed Assistant Engineer J. C. KAFER.
Assistant Engineer, A. M. MATTICE.
Cadet-Engineer A. W. STAHL.
Cadet-Engineer A. T. WOODS.
Cadet-Engineer A. E. SMITH.

CADET-ENGINEERS.

First Class (23).

Anderson, M. A.
Arnold, S.
Bankson, L.
Beach, R. J.
Belden, C. E.
Bush, A. R.
Byrne, J. E.
Dowst, F. B.
Gartley, W. H.
Kaemmerling, G.
McAlpine, K.
Moritz, A.
Parsons, I. B.
Perkins, L. B.
Redgrave, D. W. C.
Sampson, B. C.
Shallenberger, O. B.
Smith, W. S.
Stewart, R., jr.
Webster, W. T.
White, W. W.
Whitham, J. M.
Whittle, L. F.

CADET-ENGINEERS.

Second Class (26).

Addicks, W. R.
Chambers, W. H.
Clarke, A. H.
Coley, F. E.
Conant, F. H.
Creighton, W. H. P.
Day, W. B.
Ferguson, G. R.
Fitts, J. H.
Gatewood, R. W.
Gladstone, D. D.
Gsantner, O. C.
Hawthorne, H. L.
Higgins, R. B.
Howland, C. H.
Leonard, J. C.
Leopold, H. G.
McAllister, A.
Miller, P.
Pendleton, J. H.
Rommel, C. E.
Shock, T. A. W.
Taylor, E. K.
Theiss, E.
Willis, C. E.
Winchell, W. P.

UNITED STATES PRACTICE-STEAMER STANDISH.

Lieutenant-Commander C. J. TRAIN, *Commanding.*
Lieutenant F. M. WISE, *Executive Officer.*
Passed-Assistant Engineer G. H. KEARNY.
Assistant Engineer A. V. ZANE.
Cadet-Engineer W. S. SAMPLE.
Cadet-Engineer C. E. MANNING.

CADET-ENGINEERS.

Third Class (25).

Aldrich, W. S.
Armistead, S. W.
Barnes, C. E.
Baxter, W. J.
Carswell, W. B.
Darrah, W. F.
Duvall, M., jr.
Dyson, C. W.
Eaton, C. P.
Ellinger, J.
Ellicott, J. M.
Fields, H. A.
Gillis, H. A.
Glasscock, E. H.
Gross, C. J.
Halstead, A. S.
Herbert, C.
Lawrance, W. H.
Littlehales, G. W.
Palmer, J. E.
Quinby, J. H.
Ryan, P. J.
Webster, C. F.
Woodruff, C. E.
Zinnell, G. F.

CADET-ENGINEER.

Fourth Class (1).

Pattison, T. P.

The practice-steamer Despatch, accompanied by the Standish for a portion of the cruise, steamed from the Naval Academy June 17, and touched at Washington, D. C., Norfolk, Va., New Castle, Del., Edgemoor, Del., Chester, Pa., Philadelphia, Pa., New York, West Point, N. Y., Cold Spring, N. Y., Newburg, N. Y., Newport, R. I., Bristol, R. I., Rocky Point, R. I., Boston, Mass., visiting the different navy-yards, work and machine shops, iron foundries, etc., at the above-named places; and returning, anchored off the Naval Academy August 29.

TABLE OF COEFFICIENTS.

Department.	Subject.	Cadet-Midshipmen.					Cadet-Engineers.				
		Fourth class.	Third class.	Second class.	First class.	Graduating maxima for required studies.	Fourth class.	Third class.	Second class.	First class.	Graduating maxima for required studies.
Seamanship.	Seamanship	2	3	10	16						
	Naval Tactics	....	....	2							
	Ship-building	....	....	....	4	148	....	....	....	4	16
Ordnance and Gunnery.	Ordnance Instructions and Infantry Tactics	....	....	5							
	Ordnance and Armor	....	....	....	14	76					
Mathematics.	Algebra and Geometry	8	....	....	....	....	9				
	Trigonometry	....	8	....	....	....	....	6			
	Analytical Geometry	....	7	....	....	....	....	7			
	Descriptive Geometry	....	3	....	....	104	....	5	....	....	108
Steam-Engineering.	Mechanical Drawing	....	....	....	....	....	3	5	5	14	
	Fabrication of Machinery	....	....	....	....	....			6		
	Designing Machinery	....	....	....	....	....	....	....	8	22	
	Marine Engines	....	....	....	13	52	....	....	....		252
Astronomy, Navigation, and Surveying.	General Astronomy	....	....	6	....	....	....	....	4		
	Theoretical Navigation	....	....	....	8						
	Practical Navigation	....	....	....	9						
	Surveying and Compass Deviations	....	....	....		92	....	...	....	....	16
Physics and Chemistry.	Physics and Chemistry	....	4	5	....	....	....	4	5		
	Light and Heat	....	....	5	....	....	....	....	5		
	Electricity	....	....	....	6	80	....	....	....	6	
	Physical Measurements	....	....	....	....	....	....	....	....	7	108
Mechanics and Applied Mathematics.	Mechanics and Calculus	....	...	14	....	....	....	....	14		
	Applied Mechanics	....	....	....	....	....	....	....	....	11	
	Naval Architecture and Method of Least Squares	....	....	....	....	....	....	....	....	6	
	Elective Course in Naval Architecture	....	....	....	12	56	....	....	....	12	124
English Studies, History, and Law.	English and History	5	....	....	....	....	5				
	History and Rhetoric	....	6	....	....	....	....	6			
	English and History	....	....	5	....	....	....	....	5		
	Public Law	....	....	....	3	76	....	....	....	3	76
Modern Languages.	French	2	5	5	3	60	2	5	5	3	60
Drawing.	Drawing	2	2	....	....	16					
Maximum for each year, exclusive of electives		76	152	228	304	760	76	152	228	304	760
Deduction for each demerit		.004	.007	.013	.030		.004	.007	.013	.030	

MERIT-ROLLS FOR 1879-80.

Merit-rolls, made out annually for each class, show the proficiency of the cadets in each branch of study. The numbers given in the preceding table, showing the relative weight of the different branches, are used as coefficients; the final mark in each branch (on a scale of 4*) being multiplied by the number assigned to that branch. The sum of the products, after making deductions for conduct, is the final mark of the cadet for the year.*

In the case of cadets who take an elective course in any branch, the final mark in that branch is determined by adding to the final mark received in the required course one-fifth of the amount by which the final mark in the elective course exceeds 2.50.

In the graduating merit-roll, the final mark for the course is determined by the sum of the four yearly marks.

"Cadets who attain 85 *per cent. of the multiple in any year shall be distinguished by a star affixed to their names on the merit-rolls."—(Regulations U. S. Naval Academy,* § 150.*)*

Cadets whose names are marked thus (†) were found deficient, but were allowed to continue in their classes on condition of passing at a re-examination.

Those marked thus (‡) were found deficient, and turned back, to recommence the studies of their respective classes.

Those marked thus (§) were found deficient, and recommended to be dropped.

(a) denotes absence from examination.

MIDSHIPMEN.

Class of 1878 (36 *members*). *Final examination, June,* 1880.

Order of merit.	Name.	Seamanship.	Gunnery.	Naval tactics.	Steam-engineering.	Navigation and surveying.	French.	Aptitude.	Aggregate for examination.	General aggregate for four years.	Final aggregate.
	Maxima	**48**	**48**	**12**	**48**	**48**	**24**	**12**	**240**	**760**	**1,000**
*1	**John H. Fillmore**	42. 36	44. 76	10. 74	43. 20	42. 36	19. 92	11. 40	214. 74	695. 42	910. 16
*2	**Thomas S. Rodgers**	42. 60	45. 12	11. 88	44. 40	47. 40	23. 10	11. 40	225. 90	674. 96	900. 86
*3	**John G. Quinby**	40. 68	41. 04	10. 78	46. 20	46. 80	17. 82	10. 80	214. 12	666. 53	880. 65
*4	**Charles S. McClain**	40. 32	41. 04	12. 00	42. 00	42. 60	19. 56	11. 40	208. 92	654. 85	863. 77
5	James H. Glennon	42. 48	39. 72	11. 76	43. 80	40. 80	20. 82	10. 80	210. 18	647. 81	857. 99
6	Harry S. Knapp	37. 80	41. 88	11. 16	44. 40	40. 20	20. 10	11. 40	206. 94	630. 27	837. 21
7	Frank J. Sprague	25. 08	40. 92	11. 94	43. 80	45. 00	17. 40	10. 80	194. 94	628. 81	823. 75
8	William L. Rodgers	38. 04	43. 32	11. 85	43. 20	45. 00	19. 80	10. 80	212. 01	609. 63	821. 64
9	Roy C. Smith	37. 68	43. 68	11. 64	46. 80	34. 56	18. 00	11. 40	203. 76	613. 59	817. 35
10	Albert N. Wood	41. 28	40. 20	11. 97	36. 60	35. 40	16. 50	10. 20	192. 15	609. 14	801. 29
11	Edward Lloyd, jr	45. 48	40. 92	12. 00	40. 80	36. 36	17. 52	10. 80	203. 88	596. 92	800. 80
12	Harry McL. P. Huse	36. 72	36. 00	10. 86	37. 20	36. 96	23. 40	11. 70	192. 84	602. 87	795. 71
13	Richard M. Hughes	36. 60	38. 28	11. 58	38. 40	35. 40	22. 50	10. 80	193. 56	595. 38	788. 94
14	Charles N. Atwater	36. 60	39. 48	11. 79	38. 40	33. 60	20. 22	10. 20	190. 29	597. 87	788. 16
15	John H. L. Holcombe	38. 88	38. 28	11. 13	37. 26	31. 80	20. 70	10. 80	188. 79	595. 43	784. 22
16	George F. Ormsby	38. 64	41. 88	10. 68	37. 20	33. 36	16. 80	5. 25	183. 81	599. 30	783. 11
17	Robert K. Wright	39. 36	39. 00	9. 00	39. 60	39. 00	18. 90	10. 50	195. 36	583. 64	779. 00
18	Harry Kimmell	33. 48	40. 80	10. 62	35. 40	38. 76	15. 90	10. 50	185. 46	580. 91	766. 37
19	Spencer F. B. Biddle	41. 52	37. 68	9. 69	39. 60	38. 16	19. 20	10. 80	196. 65	568. 57	765. 22
20	Peyton B. Bibb	31. 32	33. 96	9. 99	36. 00	33. 96	18. 90	11. 10	175. 23	589. 66	764. 89
21	John E. McDonnell	36. 00	39. 48	11. 67	38. 40	42. 96	16. 10	10. 80	195. 41	552. 63	748. 04
22	George R. Clark	32. 76	39. 96	10. 98	42. 60	40. 20	16. 20	11. 10	193. 80	550. 03	743. 83

23	George H. Stafford	42.00	35.40	10.08	36.60	35.40	19.80	11.10	190.38	550.65	741.03
24	William C. Canfield	40.68	38.40	10.47	40.20	24.60	19.02	10.20	183.57	550.72	734.29
25	Allen G. Rogers	43.32	40.68	11.10	43.20	33.96	16.92	10.80	199.98	532.46	732.44
26	William P. White	31.68	36.12	8.67	36.60	40.80	17.40	10.20	181.47	550.65	732.12
27	John H. Shipley	42.00	38.16	10.86	43.20	31.20	17.40	11.40	194.22	537.51	731.73
28	Thomas W. Ryan	34.56	36.72	10.41	35.40	28.20	19.20	9.60	174.09	554.08	728.17
29	John E. Craven	36.60	35.88	11.01	37.20	34.80	17.82	10.80	184.11	541.33	725.44
30	George Sparhawk	36.24	32.52	10.92	32.40	30.96	16.92	10.80	170.76	541.53	712.29
31	James H. Hetherington	36.12	36.36	11.58	39.60	33.36	16.10	10.20	183.32	522.32	705.64
32	John J. Knapp	31.56	38.40	10.74	34.20	31.32	16.50	11.10	173.82	530.37	704.19
33	Baine C. Dent	40.32	33.84	10.20	34.80	30.00	15.60	10.80	175.56	520.69	696.25
34	Augustus C. Almy	36.84	32.76	11.73	32.40	26.40	18.00	9.60	167.73	514.73	682.46
	Wilson L. Todd								(*a*)	526.79	
	Horatio H. Hooke								(*a*)	523.40	
	Valentine S. Nelson (class of 1877)	38.16	39.24	11.70	41.40	39.36	19.20	10.20	199.26	559.08	758.34

CADET-MIDSHIPMEN.

Merit-roll of first class (62 members), annual examination, June, 1880, and general merit-roll for four years.

Order of general merit.	Name.	Seamanship.	Ship-building.	Ordnance.	Marine engines.	Theoretical navigation.	Practical navigation.	Heat.	Naval architecture (elective).	Public law.	Spanish.	Conduct.	Aggregate for fourth year.	Aggregate for third year.	Aggregate for second year.	Aggregate for first year.	General aggregate for four years.
	Maxima	**64**	**16**	**56**	**52**	**36**	**32**	**24**	**3.60**	**12**	**12**		**304**	**228**	**152**	**76**	**760**
*1	**Philip R. Alger**	57.60	14.00	50.12	45.63	33.12	30.16	23.04	3.12	10.80	10.20	4.44	273.35	204.83	142.93	70.22	691.33
*2	**Herman G, Dresel**	55.84	14.52	50.82	44.46	32.31	29.44	23.10	2.52	10.65	10.62	2.67	271.61	201.96	137.84	71.39	682.80
3	Luman S. Norton	54.56	13.76	48.44	44.20	30.51	25.92	20.82	2.16	9.72	9.24	4.23	255.10	190.25	131.80	64.19	641.34
4	Harry Phelps	56.96	13.68	48.58	45.89	33.66	28.24	20.88	1.80	10.02	10.56	2.64	267.63	193.45	121.16	55.82	638.06
5	John B. Bernadou	52.32	13.56	48.86	41.60	27.45	24.64	19.98	2.52	9.72	10.92	4.17	247.40	193.51	129.40	67.70	638.01
6	Patrick W. Hourigan	57.60	13.36	45.92	40.17	31.14	25.20	20.94	....	10.89	9.18	4.32	250.08	192.00	124.68	62.41	629.17
7	Albert A. Ackerman	55.68	14.12	47.18	42.77	28.89	24.08	20.34	1.56	9.57	8.55	2.76	249.98	183.86	125.98	61.83	621.65
8	William H. Wolfersberger	52.64	12.48	46.62	42.51	29.79	26.40	20.40	....	10.17	9.30	1.71	248.69	179.33	127.34	64.78	620.05
9	Homer C. Poundstone	57.12	14.12	47.74	42.90	31.23	26.80	20.88	....	10.29	10.14	2.79	258.43	195.43	103.47	50.21	607.54
10	Porter D. Haskell	54.08	12.44	44.38	41.60	28.44	25.20	19.20	....	9.93	9.69	1.44	243.52	178.80	119.03	56.78	598.13
11	Albert P. Niblack	54.24	13.32	48.58	41.86	28.35	23.76	18.42	....	10.47	8.76	1.86	245.90	179.52	116.27	54.49	596.18
12	Ernest Wilkinson	52.96	11.24	42.28	43.16	28.35	23.68	19.08	....	9.42	10.23	3.24	237.16	176.75	120.77	58.39	593.07
13	Arthur R. Howze	53.28	12.28	43.54	38.22	31.14	25.12	18.90	1.32	9.84	10.92	1.02	243.54	170,20	119.48	57,73	590.95
14	William Truxtun	56.96	13.40	46.90	43.29	27.99	24.56	19.62	1.68	10.65	8.19	2.16	251.08	170.41	108.60	59.01	589.10
15	Stokely Morgan	51.04	12.68	43.40	38.61	29.70	25.36	18.60	....	9.90	8.76	2.04	236.01	176.72	116.84	58.40	587.97
16	George E. West	48.64	11.48	41.02	37.96	27.18	25.52	19.50	0.12	9.84	9.30	3.33	227.23	177.67	120.25	57.35	582.50
17	John S. Watters	57.44	13.88	44.38	39.26	26.19	24.24	19.74	....	9.27	9.18	4.20	239.38	171.26	112.21	54.85	577.70
18	William H. Emerson	55.04	12.08	45.08	43.81	27.36	26.00	20.94	....	8.97	9.39	2.82	245.85	167.24	111.01	53.51	577.61
19	Thomas A. Parke	49.76	11.96	43.68	40.82	27.99	24.32	18.90	....	9.87	9.69	2.07	234.92	170.85	113.32	57.44	576.53
20	Louis Duncan	53.44	13.28	45.78	44.07	27.45	25.44	19.20	....	9.72	9.09	3.21	244.26	164.91	110.53	54.25	573.95
21	William C. P. Muir	53.60	11.88	44.10	39.39	27.36	23,12	18.90	....	9,48	9,09	3.06	233.86	165.11	114.92	56.49	570.38

23	Francis J. Haeseler	58.72	12.68	45.92	39.78	27.54	25.12	16.74		9.09	8.34	2.82	241.11	168.89	105.23	50.06	565.29
24	Louis S. Van Duzer	52.64	12.64	42.98	41.60	27.45	24.00	19.08		10.05	8.28	2.04	236.68	165.82	110.13	50.57	563.20
25	Joseph H. Rohrbacher	49.28	11.56	42.98	36.40	24.93	22.32	18.84		10.11	9.12	2.82	222.72	171.46	112.09	56.48	562.75
26	Joseph Beale	55.68	11.40	39.06	35.49	26.55	22.24	17.88		10.02	8.88	4.29	222.91	167.74	111.37	59.29	561.31
27	Edward Simpson, jr	55.29	12.68	46.48	37.83	27.09	23.12	17.46		9.09	8.49	2.58	234.86	165.93	104.43	55.71	560.93
28	James C. Drake	48.32	12.08	41.72	37.18	27.81	24.24	18.06		8.67	8.82	4.14	222.76	163.10	110.66	63.45	559.97
29	Joseph M. Dickson	46.56	11.16	43.68	38.87	26.73	22.96	18.84		10.86	9.00	1.53	227.13	163.02	111.90	54.46	556.51
30	George L. Dillman	49.92	10.32	41.30	35.23	23.31	22.56	15.60		8.55	8.85	4.65	210.99	171.59	118.71	55.07	536.36
31	Frank W. Bowdon	53.92	12.04	42.84	34.32	24.75	21.84	17.16		10.65	9.27	1.71	225.08	163.04	107.62	58.57	554.31
32	Augustus N. Mayer	49.44	11.72	43.40	36.27	26.37	23.20	17.52		9.48	8.55	3.81	222.14	165.09	109.12	57.55	553.90
33	William S. Sims	51.84	12.88	45.22	45.24	26.91	23.28	19.62		9.75	8.49	4.38	238.85	158.94	105.77	48.99	552.55
34	Wilson W. Buchanan	53.44	12.32	42.28	37.05	25.11	23.76	17.52		8.94	8.82	0.93	228.31	176.40	98.68	48.48	551.87
35	Edwards F. Leiper	51.36	12.64	43.54	38.74	25.38	22.80	17.22		9.69	8.46	2.22	227.61	159.73	104.24	59.62	551.20
36	Fred R. Brainard	51.20	11.16	44.24	38.48	24.48	24.64	18.00		8.37	8.37	3.39	225.55	164.26	107.20	53.31	550.32
37	William E. Safford	47.52	11.84	40.60	37.18	24.66	21.52	17.76		9.21	11.46	2.94	218.81	165.11	109.68	55.84	549.44
38	Manning K. Eyre	50.24	11.52	42.14	36.79	25.20	23.76	17.52		9.09	9.36	4.47	221.15	164.81	106.78	56.36	549.10
39	Miles C. Gorgas	50.08	10.76	30.48	36.01	24.84	22.08	16.68		8.31	10.26	3.15	215.35	173.80	104.86	53.04	547.05
40	Richard H. Scott	51.04	12.04	42.56	39.13	26.01	22.64	18.84		9.72	8.82	3.81	226.99	158.87	106.22	53.93	546.01
41	Francis R. Wall	49.12	10.88	42.00	35.88	25.02	23.44	17.22		9.90	9.27	4.08	218.65	161.34	109.42	54.73	544.14
42	Henry M. Finley	49.76	11.12	39.48	37.96	27.45	24.32	16.38		10.08	8.76	4.77	220.54	161.03	101.81	57.04	540.42
43	Horatio L. Fillebrown	46.72	10.24	39.34	36.01	23.94	21.12	15.90		8.40	8.40	3.18	206.89	157.53	105.42	62.25	532.09
44	Thomas Worthington	55.68	12.60	42.42	33.93	23.40	21.52	16.02		9.54	8.76	2.91	220.96	158.11	101.18	49.16	529.41
45	William J. Maxwell	52.96	12.40	42.14	32.89	23.04	20.80	15.72		9.27	8.13	2.64	214.71	158.37	107.49	48.73	529.30
46	Fitz-Aubert Huntoon	49.12	11.56	41.02	35.88	25.56	21.76	16.80		8.73	8.25	4.17	214.51	154.09	103.66	54.64	526.90
47	Franklin Swift	50.40	11.48	40.32	36.01	24.66	22.24	16.68		9.27	8.10	3.45	215.71	155.89	99.76	53.31	524.67
48	Charles H. Hill	55.20	11.56	39.48	36.66	22.68	20.88	16.02		10.38	8.31	4.65	216.52	164.03	91.25	50.43	522.23
49	George R. French	46.88	10.80	39.20	34.19	21.78	21.52	17.94		9.48	8.34	3.93	206.20	153.74	111.72	49.47	521.13
50	Henry B. Ashmore	49.92	11.72	37,80	35.62	24.93	21.36	16.86		8.73	9.03	4.62	211.35	158.54	99.13	50.13	519.15
51	James Gray	48.00	10.52	43.12	34.58	24.21	21.52	15.84		10.53	7.98	3.81	212.49	153.13	96.65	55.37	517.64
52	Theodore G. Dewey	46.40	10.72	40.32	34.06	23.40	21.12	16.50		8.76	7.83	2.82	206.29	154.46	99.27	56.93	516.95
53	Ambrose Cramer	48.32	10.92	38.78	33.54	22.95	21.68	16.02		8.94	7.95	3.54	205.56	154.46	103.60	52.14	515.76
54	John F. Luby	52.16	12.00	41.86	34.84	23.76	21.60	15.90		9.48	8.43	4.32	215.71	154.37	96.03	46.35	512.46
55	Walter G. Richardson	44.64	10.16	39.48	35.23	22.14	21.60	16.20		9.57	8.64	4.20	203.46	157.65	99.18	49.90	510.19
56	Lewis J. Clark	47.04	11.00	38.08	33.80	24.12	23.28	18.12		8.76	7.95	4.59	207.56	153.38	103.20	45.87	510.01

CADET-MIDSHIPMEN—Continued.

Merit-roll of first class (62 members), annual examination, June, 1880, and general merit-roll for four years.

Order of general merit.	Name.	Seamanship.	Ship-building.	Ordnance.	Marine engines.	Theoretical navigation.	Practical navigation.	Heat.	Naval architecture (elective).	Public law.	Spanish.	Conduct.	Aggregate for fourth year.	Aggregate for third year.	Aggregate for second year.	Aggregate for first year.	General aggregate for four years.
	Maxima	**64**	**16**	**56**	**52**	**36**	**32**	**24**	**3.60**	**12**	**12**		**304**	**228**	**152**	**76**	**760**
57	Edwin W. Nash	46. 88	11. 04	39. 06	35. 75	25. 56	22. 00	16. 62	....	9. 06	8. 28	4. 98	209. 27	152. 51	96. 32	48. 63	506. 73
58	James S. Brown	48. 48	10. 40	37. 38	33. 41	24. 03	20. 48	15. 78	....	8. 52	8. 01	4. 59	201. 90	149. 87	97. 85	52. 52	502. 14
59	Oliver H. P. Belmont	48. 32	10. 24	35. 56	32. 76	20. 97	20. 00	15. 30	....	7. 80	8. 40	4. 32	195. 03	156. 31	98. 98	51. 32	501. 64
60	Edward Brinley	44. 32	10. 60	41. 02	34. 45	23. 31	21. 68	15. 24	....	8. 85	8. 49	1. 56	206. 40	148. 49	96. 76	48. 74	500. 39
61	Hugh Rodman	46. 40	11. 12	38. 78	35. 23	22. 23	21. 36	16. 02	....	8. 58	7. 98	3. 51	204. 19	147. 46	95. 53	51. 86	499. 04
†	Howard H. Bullitt	42. 72	10. 36	38. 50	31. 20	22. 23	20. 24	15. 30	....	8. 13	8. 16	2. 94	193. 90	147. 41	95. 12	53. 50	489. 93

Merit-roll of second class (78 members), annual examination, June, 1880.

Order of annual merit.	Name.	Seamanship.	Naval tactics.	Ordnance instructions and infantry tactics.	Astronomy.	Heat and light.	Mechanics and applied mathematics.	Composition.	French.	Conduct.	Aggregate.
	Maxima	**40**	**8**	**20**	**24**	**40**	**56**	**20**	**20**		**228**
*1	**J. L. Schock**	34.40	7.62	18.05	21.96	39.40	58.66	16.90	15.40	0.99	211.40
*2	**J. J. Woodward**	35.50	7.70	17.10	21.18	38.40	54.04	17.20	15.10	0.75	205.47
*3	**J. H. Linnard**	33.30	7.22	16.25	21.42	37.90	54.88	16.70	16.85	1.22	203.30
*4	**J. A. Hoogewerff**	33.40	7.52	17.10	21.06	38.70	51.80	17.20	15.70	1.16	201.32
*5	**F. C. Rider**	33.00	6.88	16.85	20.46	37.50	53.06	17.30	15.10	1.43	198.72
*6	**J. L. Rees**	33.00	7.34	17.25	21.00	33.80	52.78	17.80	16.45	2.04	197.38
*7	**L. Karmany**	34.70	6.22	16.35	21.72	38.20	44.80	17.40	17.75	0.64	196.50
*8	**F. E. Sutton**	28.60	7.30	16.05	20.82	38.40	49.84	16.80	18.20	0.74	195.27
*9	**R. B. Dashiell**	36.60	7.64	18.40	19.20	32.40	45.64	17.30	17.75	0.32	194.61
10	H. K. White	32.90	7.58	16.20	20.40	35.50	49.00	16.40	15.45	0.64	192.79
11	E. E. Capehart	32.90	6.80	16.15	19.86	34.90	45.50	14.95	17.15	0.88	187.33
12	E. Carroll	31.20	6.86	16.30	20.40	31.60	49.00	16.45	15.05	1.34	185.52
13	W. H. Stayton	30.60	5.72	15.65	18.48	35.80	49.70	14.75	15.25	2.25	183.70
14	F. E. Bunts	34.40	7.38	15.90	18.24	34.00	41.58	15.85	16.10	0.34	183.11
15	H. Eldredge	35.50	7.24	17.55	18.66	30.10	39.48	16.65	16.30	0.92	180.56
16	T. Serata	32.80	5.94	14.00	19.68	30.10	50.40	14.70	13.55	0.84	180.33
17	C. H. Lauchheimer	31.70	5.78	16.45	18.12	35.30	40.88	15.20	17.15	1.95	178.63
18	A. R. Hasson	31.60	6.50	16.40	19.56	34.20	42.00	15.45	14.05	2.43	177.33
19	R. P. Forshew	31.40	6.82	16.75	18.78	31.10	39.48	16.80	15.50	0.40	176.23
20	C. A. Doyen	32.40	6.56	16.85	18.96	29.70	41.30	15.95	16.45	2.01	176.16
21	G. Wilkes	36.20	6.70	15.35	19.14	29.30	40.46	15.40	14.50	1.90	175.15
22	H. B. Andrews	32.20	7.34	15.35	18.54	31.70	38.22	15.30	16.80	1.09	174.36

CADET-MIDSHIPMEN.

Merit-roll of second class (78 members), annual examination, June, 1880—Continued.

Order of annual merit.	Name.	Seamanship.	Naval tactics.	Ordnance instructions and infantry tactics.	Astronomy.	Heat and light.	Mechanics and applied mathematics.	Composition.	French.	Conduct.	Aggregate.
	Maxima	**40**	**8**	**20**	**24**	**40**	**56**	**20**	**20**		**228**
23	H. B. Wilson	31. 40	7. 10	15. 20	16. 74	30. 50	46. 34	15. 25	13. 75	1. 96	174. 32
24	F. H. Hunicke	31. 00	6. 38	16. 45	16. 44	27. 60	42. 56	16. 70	17. 40	0. 88	173. 65
25	E. H. Harrison	32. 30	7. 52	15. 30	16. 50	32. 10	42. 56	14. 80	13. 40	1. 21	173. 27
26	F. J. Moses	30. 20	6. 82	15. 10	18. 06	32. 70	44. 94	13. 50	13. 90	2. 16	173. 06
27	G. P. Blow	33. 40	6. 94	17. 25	17. 76	28. 10	39. 90	16. 10	13. 70	2. 05	171. 10
28	G. Barnett	32. 30	6. 74	15. 60	18. 72	30. 90	38. 22	15. 30	13. 65	0. 40	171. 03
29	B. G. Pierce	30. 70	6. 90	15. 90	19. 38	31. 30	38. 50	16. 15	13. 95	2. 27	170. 51
30	J. E. Mahoney	32. 10	6. 96	16. 50	16. 02	29. 20	37. 24	16. 25	16. 30	0. 96	169. 61
31	C. M. Perkins	30. 40	6. 66	16. 70	18. 72	26. 70	41. 16	15. 10	15. 10	1. 29	169. 25
32	F. W. Smies	30. 50	6. 92	15. 50	17. 94	30. 30	38. 92	15. 85	14. 70	1. 66	168. 97
33	S. Uriu	32. 50	7. 02	14. 45	16. 74	27. 80	38. 50	17. 05	14. 70	0. 61	168. 15
34	H. C. Haines	31. 50	6. 08	16. 65	16. 92	27. 90	39. 76	16. 20	14. 50	1. 73	167. 78
35	H. L. Ballentine	30. 90	6. 62	14. 65	16. 92	30. 60	38. 50	16. 40	14. 75	1. 70	167. 64
36	J. A. Kimball	32. 30	6. 28	15. 35	18. 36	29. 00	38. 92	14. 95	14. 55	2. 34	167. 37
37	W. F. Flournoy	25. 80	6. 30	15. 10	18. 00	31. 30	38. 50	15. 40	17. 60	1. 59	166. 41
38	J. W. Weeks	30. 60	6. 56	16. 30	16. 44	30. 70	38. 22	14. 80	13. 60	0. 95	166. 27
39	G. M. Buck	30. 00	6. 88	14. 40	17. 28	30. 90	37. 94	14. 00	13. 75	0. 45	164. 70
40	J. H. Colwell	30. 30	6. 00	16. 15	17. 76	30. 40	36. 12	14. 00	14. 25	1. 04	163. 94
41	O. E. Weller	28. 60	6. 86	14. 90	17. 16	27. 10	39. 76	15. 95	15. 70	2. 14	163. 89
42	H. R. Cohen	32. 50	7. 06	15. 90	16. 80	27. 50	35. 28	15. 10	14. 20	0. 78	163. 56
43	C. P. George	30. 70	6. 04	16. 60	15. 54	29. 40	37. 66	14. 80	13. 90	1. 10	163. 54
44	W. M. Robinson	31. 50	5. 66	15. 85	16. 56	29. 00	39. 06	13. 35	13. 50	1. 33	163. 15

46	E. M. Harmon	32.50	5.88	15.20	17.94	26.80	35.70	15.95	14.50	2.46	162.01
47	C. W. Stewart	29.30	6.64	14.45	16.44	28.20	38.78	14.95	15.55	2.51	161.80
48	W. L. Emmet	30.20	6.64	15.40	17.58	25.70	40.32	15.30	12.80	2.44	161.50
49	D. L. Printup	29.30	5.88	14.55	17.34	27.70	38.50	14.60	14.40	1.46	160.81
50	S. M. Kase	27.10	5.28	14.30	18.06	27.20	38.22	15.70	15.10	0.55	160.41
51	R. R. Cockle	32.10	5.22	15.00	16.80	26.50	37.10	16.20	13.85	2.40	160.37
52	R. P. Hains	28.00	5.86	16.55	16.50	28.80	37.52	14.95	13.90	1.91	160.17
53	S. Bryan	29.30	6.92	14.75	16.44	27.40	38.08	14.55	14.35	1.65	160.14
54	G. Clarke	27.00	6.28	14.50	17.58	28.10	39.76	14.55	13.55	1.92	159.40
55	M. J. Donnelly	28.90	5.90	14.70	16.74	30.80	35.28	13.20	14.30	2.08	157.74
56	A. S. McCrea	27.60	5.70	14.00	15.18	26.60	36.96	15.90	16.75	2.38	156.31
57	A. C. Parsons	28.80	5.00	14.55	16.50	25.50	36.82	16.45	13.15	1.62	155.15
58	G. G. Rodgers	29.70	6.74	14.60	15.48	26.50	35.70	13.75	14.60	2.46	154.61
59	T. H. Matthews	26.70	5.70	14.15	15.96	26.90	38.64	14.15	14.60	2.76	154.04
60	J. W. Dresser	27.50	5.40	14.05	16.20	25.70	39.34	14.30	13.40	2.35	153.54
61	B. H. Craig	28.30	5.84	13.25	15.24	26.90	35.98	14.10	13.80	1.60	151.81
62	S. H. Williamson	26.90	5.00	14.25	16.38	25.90	36.26	13.85	14.10	1.65	150.99
63	T. L. Bonfils	26.60	6.50	13.45	16.44	26.80	36.82	12.80	13.00	2.08	150.33
64	W. W. Russell	25.70	5.36	13.35	14.76	26.00	35.56	14.45	17.75	2.83	150.10
65	M. A. Orlopp	29.70	5.34	13.85	15.54	26.90	37.38	10.40	13.15	2.52	149.74
†	I. McJunkin	30.90	5.76	17.00	14.82	27.70	33.74	17.35	14.75	0.32	161.70
†	M. Craven	35.00	6.46	15.00	15.54	24.10	36.12	15.05	14.20	2.34	159.13
†	J. D. Crenshaw	30.60	4.76	14.70	17.16	26.30	38.92	12.35	14.05	1.47	157.37
†	F. Parker	28.00	6.42	14.55	15.60	23.40	35.00	15.95	18.45	2.82	154.55
†	W. A. Gresham	28.60	6.48	14.50	15.00	26.70	32.20	15.45	13.55	0.99	151.49
†	A. C. Oliphant	27.10	5.50	13.95	15.06	26.00	34.44	14.05	13.25	0.39	148.96
†	G. E. Perry	25.60	5.70	13.80	15.36	24.30	35.98	15.55	13.75	2.43	147.61
†	S. H. Wright	27.40	5.80	14.50	15.00	25.30	34.16	13.05	13.75	1.42	147.54
†	Z. B. Vance	27.00	5.58	13.35	15.90	23.50	36.82	13.10	13.40	2.59	146.06
†	L. T. McKee	27.00	5.22	14.00	15.12	23.70	35.00	13.95	13.05	2.30	144.74
†	D. Morgan	24.00	4.88	12.75	15.06	26.40	35.56	14.20	13.05	1.53	144.37
†	J. H. Lindsey	24.50	4.62	13.55	14.82	25.50	35.00	14.95	13.25	2.26	143.93
	Y. Enouye	27.30	5.20	13.30	13.14	16.60	14.84	14.50	....	0.38	104.50

CADET-MIDSHIPMEN.

Merit-roll of third class (48 *members*), *annual examination, June,* 1880.

Order of annual merit.	Name.	Seamanship.	Trigonometry.	Analytical geometry.	Descriptive geometry.	Physics and chemistry.	History and rhetoric.	French.	Drawing.	Conduct.	Aggregate.
	Maxima	**12**	**32**	**28**	**12**	**16**	**24**	**20**	**8**		**152**
*1	**L. Nixon**	9.66	31.60	28.63	11.55	14.68	21.60	16.05	7.42	1.20	139.99
2	S. S. Wood	10.68	29.76	23.17	10.80	12.40	19.56	15.35	7.80	0.33	129.19
3	J. T. Arnold	8.52	28.64	26.04	11.55	13.84	17.58	13.25	7.60	1.57	125.45
4	L. S. Bennett	9.00	25.28	21.70	9.30	12.88	21.24	16.85	6.90	1.08	122.07
5	E. W. Sutphen	11.13	25.52	22.33	10.83	11.72	19.32	13.30	7.82	0.75	121.22
6	W. R. M. Field	9.00	25.12	24.92	9.69	11.72	18.84	16.40	5.70	1.09	120.30
7	W. B. Fletcher	9.96	24.88	21.77	10.17	12.12	19.68	13.80	7.48	0.55	119.31
8	M. Johnston	9.12	25.52	23.31	10.02	12.16	18.24	14.85	6.60	1.22	118.60
9	H. A. Horst	9.45	24.88	19.88	8.58	12.60	18.66	17.60	6.96	0.73	117.88
10	L. Semple	9.06	23.60	22.47	8.28	11.76	18.66	16.85	6.88	1.33	116.23
11	W. L. Howard	9.18	24.96	19.25	9.45	10.36	17.88	17.05	7.50	0.97	114.66
12	H. H. Kenkel	10.11	26.32	19.39	10.44	11.80	16.08	12.85	7.78	1.07	113.70
13	W. B. Whittelsey	9.87	24.64	20.37	9.69	12.04	17.64	12.50	7.46	0.67	113.54
14	J. J. Blandin	9.00	22.16	20.16	9.09	11.84	19.38	15.75	7.08	1.59	112.87
15	W. N. King, jr	9.51	24.56	18.34	9.06	10.68	18.78	16.50	7.10	1.74	112.79
16	J. G. Doyle	9.45	23.44	21.56	9.18	12.08	18.12	12.75	7.10	1.23	112.45
17	J. G. McWhorter	9.24	25.20	22.19	9.15	11.04	17.94	13.25	5.76	1.43	112.34
18	W. T. Paine	7.65	24.00	22.75	8.22	10.88	16.68	16.75	5.96	0.71	112.18
19	T. C. Prince	9.36	22.88	18.97	10.17	11.96	17.70	14.05	7.48	0.52	112.05
20	E. A. Anderson	8.97	22.32	20.37	9.54	12.92	18.72	14.20	6.86	1.01	111.89
21	W. J. Grambs	9.00	23.60	21.14	8.88	11.08	17.10	13.20	7.72	1.64	110.08
22	L. R. Savage	8.34	23.28	21.21	9.27	11.08	17.82	13.40	5.68	0.67	109.41
23	A. L. Key	8.16	23.52	21.84	8.25	11.12	18.72	13.45	5.66	1.68	109.04
24	C. Martin	8.10	24.96	19.46	7.74	10.64	17.52	15.55	5.24	0.87	108.34
25	W. B. Duncan	9.72	21.12	19.11	9.00	11.16	15.42	18.65	5.84	1.77	108.25
26	J. J. Conway	9.00	22.00	18.69	7.71	10.00	19.32	14.90	6.12	1.08	106.66
27	J. M. Poyer	7.71	24.16	18.62	8.19	10.92	19.38	14.25	5.22	1.83	106.62
28	H. H. Eames	10.17	22.72	17.50	9.09	10.88	16.32	13.70	7.62	1.75	106.25
29	F. H. Stahle	8.34	21.52	17.85	7.77	10.60	17.16	15.50	6.46	1.66	103.54
30	N. M. Hubbard	8.64	21.04	19.18	8.40	10.40	17.16	13.35	6.80	1.75	103.22
31	C. J. Dudley	9.24	22.64	18.13	9.51	10.00	16.02	13.20	5.54	1.41	102.87
32	L. S. Gwyn	8.55	18.32	21.77	7.50	10.64	16.08	13.50	5.00	1.11	100.25
33	H. Fowler	8.49	18.16	17.85	7.44	10.28	16.92	13.50	6.38	1.55	97.47
34	F. F. E. Lodeman	8.37	18.40	17.92	7.41	10.08	15.54	14.10	5.88	1.65	96.05
†	J. L. Jayne	9.87	23.04	20.86	10.32	11.76	17.16	12.20	7.18	1.77	110.62
†	G. E. Kent	8.61	21.44	17.50	9.27	10.20	15.84	12.20	7.64	1.50	101.20
†	W. E. Morris	9.09	20.80	15.89	8.97	10.96	16.26	11.85	7.72	1.50	100.04
†	J. W. Smythe	8.82	20.40	17.15	8.52	10.00	15.78	11.65	7.60	0.75	99.17
†	S. A. W. Patterson	8.82	20.64	17.71	8.25	10.40	16.14	11.90	5.78	1.61	98.03
†	P. N. McGiffen	9.30	20.00	17.29	7.26	10.44	16.20	13.10	5.10	1.22	97.47
†	E. N. Bell	8.70	18.96	17.99	7.59	9.20	18.24	11.00	6.62	1.29	97.01
§	W. P. Hoke	9.18	19.12	17.92	7.38	8.84	16.92	13.70	5.34	1.60	96.8
§	J. A. Lamkin	7.32	20.16	16.24	6.96	10.36	16.20	11.80	6.58	0.93	94.6
†	O. D. Norton	7.05	20.00	16.73	8.10	10.04	15.24	12.55	5.82	1.41	94.1
‡	G. M. von Schrader	6.60	19.28	15.05	7.56	9.44	15.72	11.90	6.68	1.57	90.6
†	S. Ashby	6.03	20.00	16.31	6.99	7.56	15.54	13.20	5.20	1.30	89.5
†	T. W. Hayden	7.77	20.16	14.84	6.87	7.20	14.40	13.05	6.10	1.92	88.4
	F. A. McNutt	*a*	24.16	*a*	*a*	*a*	*a*	*a*	5.80	0.59	

CADET-MIDSHIPMEN.

Merit-roll of fourth class (60 members), annual examination, June, 1880.

Order of annual merit.	Name.	Seamanship.	Mathematics.	History and English.	French.	Drawing.	Conduct.	Aggregate.
	Maxima	**8**	**32**	**20**	**8**	**8**		**76**
*1	**Samuel D. Greene, jr**	7.34	30.56	17.55	6.96	6.52	0.28	68.65
*2	**George W. Street**	7.10	31.60	17.30	6.18	6.46	0.30	68.34
*3	**John B. Jackson**	6.66	29.76	17.50	6.54	6.96	0.19	67.23
*4	**Charles E. Sweeting**	6.38	30.24	16.85	6.16	7.10	0.74	65.99
5	William E. Bowman	6.44	28.16	17.10	6.52	6.70	0.36	64.56
6	Thomas H. Gignilliat	6.50	27.76	15.05	5.76	7.50	0.48	62.09
7	Edmund E. Kiefer	5.82	27.36	14.95	6.08	6.22	0.52	59.91
8	Robert H. Woods	6.32	24.48	15.70	6.54	6.68	0.26	59.46
9	Charles F. Hepp	6.42	23.52	16.10	6.18	7.42	0.19	59.45
10	Benjamin E. Thurston	5.88	25.52	14.35	6.50	7.30	0.18	59.37
11	Patrick H. Philbin	6.00	25.44	15.20	6.06	7.02	0.61	59.11
12	Robert T. Frazier	6.32	24.24	16.45	6.20	5.88	0.42	58.67
13	Alfred P. Agee	6.26	26.08	15.60	5.56	5.68	0.54	58.64
14	Cyrus T. Brady	5.90	24.16	16.60	6.40	6.62	1.10	58.58
15	Albion S. Keith	6.06	24.40	15.00	5.96	7.14	0.31	58.25
16	William A. Megrath	6.10	26.64	14.20	5.38	6.38	0.48	58.22
17	Harry George	6.06	24.00	16.25	5.90	6.40	0.58	58.03
18	Harry H. Balthis	6.26	23.68	15.90	5.46	6.52	0.38	57.44
19	Elton W. Dalrymple	5.58	25.36	14.70	5.96	6.22	0.78	57.04
20	Michael E. Lennon	5.78	23.44	16.45	5.00	6.22	0.42	56.47
21	Frederick L. Chapin	6.06	21.68	15.00	6.06	7.16	0.24	55.72
22	John H. Barnard	6.54	22.32	13.95	6.18	7.44	0.76	55.67
23	John A. Jackson	6.10	22.24	15.95	6.04	5.82	0.63	55.52
24	Alexander B. Legaré	5.42	23.84	13.80	5.90	6.80	0.58	55.18
25	George C. Stout	5.94	21.76	15.25	5.46	7.06	0.33	55.14
26	Thomas A. Witherspoon	6.90	22.40	14.40	5.26	6.48	0.30	55.14
27	Edwin B. Weeks	6.22	24.24	13.75	6.18	5.68	1.01	55.06
28	Tremlet V. Toney	6.30	21.60	15.50	5.38	6.44	0.44	54.78
29	Sidney Z. Mitchell	5.94	23.04	14.25	6.28	5.82	0.72	54.61
30	Willie T. Gray	6.12	22.32	14.00	6.02	6.52	0.48	54.50
31	Timothy S. O'Leary	6.06	21.28	14.15	6.10	6.70	0.36	53.93
32	Charles R. Reynolds	5.52	22.88	13.35	5.62	6.74	0.29	53.82
33	James J. G. Cooper	5.56	22.08	15.60	5.28	5.66	0.71	53.47
34	William W. Ricketts	5.76	23.76	13.40	5.16	5.68	0.29	53.47
35	Robert L. Lerch	5.88	20.80	14.35	6.26	5.90	0.14	53.05
36	Robert C. Alexander	5.22	20.80	14.30	5.50	7.30	0.28	52.84
37	Frank R. Colvin	5.08	20.80	15.45	5.84	5.46	0.39	52.24
38	Edwin G. Temple	5.36	20.40	15.60	5.22	5.38	0.21	51.75
39	Arthur Dovalé	5.14	20.88	12.95	6.34	5.88	0.74	50.45
40	William J. Wilson	5.54	20.80	12.90	5.16	5.60	0.22	49.78
41	Thomas B. Smith	5.40	20.32	14.00	5.38	5.08	1.20	48.98
†	Harry C. Pettit	5.38	20.32	13.70	4.72	6.30	0.52	49.90
†	James F. Carpenter	5.54	19.68	13.95	5.00	5.88	0.58	49.47
†	Edward E. Solomon	5.08	21.20	13.85	4.80	5.06	0.93	49.06
†	William H. Ledbetter	4.78	20.16	13.45	5.66	5.30	0.50	48.85
‡	Josiah S. McKean	5.56	21.44	12.25	4.90	5.42	1.29	48.28
†	Foxhall A. Parker	5.32	20.00	13.00	4.86	4.96	0.64	47.50

CADET-MIDSHIPMEN—Continued.

Merit-roll of fourth class (60 *members*), *annual examination, June*, 1880.

Order of annual merit.	Name.	Seamanship.	Mathematics.	History and English.	French.	Drawing.	Conduct.	Aggregate.
	Maxima	**8**	**32**	**20**	**8**	**8**		**76**
†	Charles P. Plunkett	5. 62	19. 52	12. 55	5. 26	5. 32	1. 09	47. 18
‡	Leon H. Jastremski	4. 30	20. 32	10. 80	5. 82	5. 36	0. 76	45. 84
‡	Alonzo E. McIntire	5. 22	16. 48	13. 25	4. 84	6. 76	1. 13	45. 42
§	Harry Rankin	5. 40	18. 48	11. 85	5. 00	5. 78	1. 23	45. 28
‡	Wirt McCreary	5. 96	14. 40	13. 20	4. 42	5. 44	0. 78	42. 64
†	Edward R. Cassidy	6. 26	14. 48	10. 70	5. 00	6. 56	1. 20	41. 80
§	John A. McCook	5. 22	14. 24	12. 40	4. 16	6. 48	0. 71	41. 79
‡	Raymond R. W. B. Stevens	5. 24	14. 00	11. 65	5. 66	5. 12	0. 66	41. 01
‡	Charles R. Mitchell	4. 56	14. 40	12. 35	3. 48	5. 28	0. 24	39. 83
‡	Frederick H. Sparling	6. 10	13. 92	10. 00	5. 00	5. 38	1. 13	39. 27
§	Arlington L. Lovenskiold	4. 54	12. 32	11. 75	5. 66	5. 28	0. 42	39. 13
‡	Harlem Pefley	*a*	*a*	*a*	*a*	*a*	......	......
	Louis M. Wentworth	*a*	*a*	*a*	*a*	*a*	......	......

CADET-ENGINEERS.

Merit-roll of first class (18 *members*), *annual examination, June,* 1880, *and general merit-roll for four years.*

Order of general merit.	Name.	Ship-building.	Mechanical drawing, and fabrication.	Designing machinery, and marine engines.	Heat and light.	Physical measurements.	Mechanics.	Naval architecture, and method of least squares.	Naval architecture (elective).	Public law.	Spanish.	Demerits.	Aggregate for fourth year.	Aggregate for third year.	Aggregate for second year.	Aggregate for first year.	General aggregate for four years.
	Maxima	**16**	**56**	**88**	**24**	**28**	**44**	**24**		**12**	**12**		**304**	**228**	**152**	**76**	**760**
*1	**Albert William Stahl**	13.08	50.68	79.20	22.74	25.20	38.83	22.32	3.00	11.04	9.81	2.85	273.05	206.10	137.21	68.11	684.47
*2	**William Frederic Durand**	14.28	49.42	79.20	22.50	24.85	39.82	22.50	3.12	10.89	10.08	2.40	274.26	205.10	135.56	61.92	676.84
3	William Frederick Converse Hasson	12.36	45.22	61.82	22.38	25.90	34.54	20.34	2.28	10.08	9.00	4.59	239.33	191.90	137.19	69.07	637.49
4	Leo Dwight Miner	13.16	44.66	62.92	19.86	25.20	34.76	21.00	2.16	9.45	8.31	1.62	239.86	187.67	123.88	63.09	614.50
5	Winfield Scott Sample	12.48	45.78	71.06	19.26	24.15	37.07	20.16	2.40	9.39	9.15	1.35	249.55	180.47	118.92	59.33	608.27
6	Arthur Tennatt Woods	12.08	49.56	66.44	18.36	22.54	33.77	20.16	2.16	9.27	9.00	3.33	240.01	179.59	120.14	56.70	596.44
7	Joseph Learned Wood	11.52	42.84	59.84	18.72	25.90	35.31	16.44	0.60	10.29	9.72	2.82	228.36	178.26	119.50	59.27	585.39
8	Charles Edward Manning	13.08	47.04	66.22	18.06	21.00	32.34	15.90	....	9.03	8.64	1.65	229.66	171.40	110.80	55.30	567.16
9	Harry Hall	13.36	39.06	66.22	19.08	21.84	38.72	19.80	2.16	9.99	9.12	1.14	238.21	165.84	107.88	50.64	562.47
10	William Hillary Allderdice	11.76	42.00	58.52	16.74	22.75	29.81	17.34	1.32	9.39	8.82	6.51	211.94	172.74	117.19	55.69	557.56
11	Albert Osborne Young	10.36	43.26	59.62	16.86	25.20	31.24	16.50	....	9.33	8.73	1.65	219.45	168.47	111.62	55.85	555.39
12	Albert Edward Smith	12.12	47.32	61.82	17.58	23.10	28.38	17.22	....	9.60	8.43	3.72	221.85	168.05	107.38	56.26	553.54
13	Charles Alfred King	12.28	40.74	61.60	18.54	23.10	31.24	16.86	0.60	10.17	9.15	3.24	221.04	167.62	105.77	54.13	548.56
14	Thomas Wright Kinkaid	11.36	40.60	56.32	19.20	24.50	28.27	16.74	....	9.81	8.16	3.09	211.87	167.30	109.35	55.80	544.32
15	William Dixon Weaver	9.92	42.00	58.74	17.70	18.34	29.37	16.20	....	10.05	9.00	4.89	206.43	157.55	103.13	51.16	518.27
16	John Leeds Worthington	10.72	39.20	55.22	15.00	17.50	28.27	16.26	....	8.79	9.21	1.53	198.64	157.92	99.13	53.02	508.71
17	William Strother Smith	10.20	39.76	55.22	16.08	21.00	26.84	16.08	....	8.82	8.55	3.54	199.01	155.02	97.19	49.71	500.93
†	Clarence Herbert Mathews	11.00	39.34	54.12	16.74	23.10	29.48	16.68	....	9.03	8.46	3.90	204.05	160.91	101.11	50.22	516.29

CADET-ENGINEERS.

Merit-roll of second class (27 members), annual examination, June, 1880.

Order of annual merit.	Name.	Mechanical drawing.	Fabrication of machinery.	Designing machinery.	Astronomy.	Heat and light.	Mechanics and applied mathematics.	Composition.	French.	Conduct.	Aggregate.
	Maxima	**20**	**24**	**32**	**16**	**40**	**56**	**20**	**20**		**228**
1	Jay M. Whitham........	17.40	19.74	26.56	12.76	33.00	52.08	13.90	13.50	0.77	188.17
2	Gustave Kaemmerling ..	16.10	18.48	23.76	13.00	31.20	45.22	16.40	15.40	1.16	178.40
3	Oliver B. Shallenberger..	16.55	20.34	26.00	13.96	31.50	39.48	17.05	14.90	1.82	177.96
4	Llewellyn F. Whittle....	16.35	19.68	24.16	13.72	32.90	38.92	17.20	16.70	2.52	177.11
5	Charles E. Belden	15.70	18.06	22.16	12.20	31.80	40.18	14.70	15.60	0.66	169.74
6	James E. Byrne	15.65	19.62	22.96	12.32	31.00	40.04	15.55	14.35	2.04	169.45
7	Kenneth McAlpine......	14.05	18.30	22.00	11.84	28.60	42.42	16.45	17.00	2.26	168.40
8	De Witt C. Redgrave....	16.15	17.34	23.92	11.88	29.20	38.92	17.70	14.15	1.05	168.21
9	Frank B. Dowst	15.60	18.18	23.12	11.96	29.20	37.94	17.05	16.30	1.44	167.91
10	William T. Webster.....	16.00	20.04	23.12	12.20	29.20	37.24	16.30	14.25	1.52	166.83
11	Lloyd Bankson...........	14.40	18.18	23.52	11.80	29.90	40.04	14.75	13.70	1.08	165.21
12	Thomas J. Hogan	17.75	20.04	21.28	12.72	26.20	38.64	14.70	15.00	2.04	164.29
13	William W. White	15.20	17.34	22.00	11.00	28.70	39.48	16.10	14.00	1.56	162.26
14	William S. Smith........	14.95	18.00	22.72	12.12	32.40	35.28	14.85	12.75	0.97	162.10
15	Isaac B. Parsons	17.25	19.20	23.20	11.28	26.30	36.54	15.80	12.50	2.40	159.67
16	Robert Stewart, jr.......	13.05	16.74	20.88	12.64	28.10	35.98	17.25	15.90	0.88	159.66
17	Lyman B. Perkins.......	16.25	17.28	21.92	11.64	28.20	36.40	14.40	14.05	2.17	157.97
18	Bias C. Sampson..........	14.80	17.70	22.16	12.16	26.90	36.26	13.50	13.35	1.35	155.48
19	Arthur R. Bush	15.25	18.78	21.92	10.52	28.20	37.10	12.05	14.00	2.59	155.23
20	Robert J. Beach..........	15.00	18.42	20.80	10.20	25.80	35.00	15.10	12.60	2.53	150.39
†	Martin A. Anderson.....	16.65	18.90	23.28	11.24	24.40	36.68	15.65	16.00	1.68	161.12
†	Solon Arnold	13.80	16.86	19.68	11.72	25.90	35.00	16.50	16.10	1.66	153.90
†	Herman Eckel	14.10	15.90	16.40	10.68	26.60	35.14	16.55	17.65	0.92	152.10
†	William H. Gartley......	14.10	17.82	19.36	10.24	25.10	38.08	15.80	13.80	2.35	151.95
†	Albert Moritz...........	14.65	16.44	19.60	10.56	27.20	35.00	14.70	14.55	1.61	151.09
‡	Andrew McAllister	14.35	19.74	16.72	10.16	25.10	32.20	16.70	13.95	1.62	147.30
	William Lang..........	14.35	*a*	*a*	*a*	*a*	*a*	16.55		1.03	

CADET-ENGINEERS.

Merit-roll of third class (28 members), annual examination, June, 1880.

Order of annual merit.	Name.	Trigonometry.	Analytical geometry.	Descriptive geometry.	Mechanical drawing and fabrication.	Physics and chemistry.	History, composition and rhetoric.	French.	Conduct.	Aggregate.
	Maxima	**24**	**28**	**20**	**20**	**16**	**24**	**20**		**152**
*1	**Emil Theiss**	23.58	27.16	19.10	16.20	15.32	22.56	19.40	1.22	142.10
*2	**Robert W. Gatewood**	23.22	28.91	18.95	14.55	14.08	21.00	18.45	1.62	137.54
*3	**William H. P. Creighton**	22.62	24.64	17.55	15.45	11.96	21.36	17.45	0.52	130.51
*4	**George R. Ferguson**	21.36	24.57	18.95	17.30	13.60	18.72	15.15	0.26	129.39
5	Peter Miller	20.70	25.27	16.85	15.05	13.88	21.24	16.50	1.36	128.13
6	James H. Fitts	19.50	24.71	16.75	15.65	12.76	20.28	18.40	1.34	126.71
7	William H. Chambers	18.90	22.82	18.30	16.15	13.20	21.24	15.90	0.57	125.94
8	Charles E. Rommell	18.66	23.38	17.85	15.85	11.00	20.28	15.70	0.47	122.25
9	Frank H. Conant	18.24	19.67	15.95	16.00	12.72	19.20	16.10	0.76	117.12
10	Arthur H. Clarke	18.66	20.58	15.85	13.85	11.80	20.58	16.30	1.11	116.51
11	Harry L. Hawthorne	18.42	19.95	16.10	15.15	11.32	20.04	14.20	0.95	114.23
12	Willis B. Day	18.36	20.44	15.65	15.55	11.44	17.46	14.70	0.66	112.94
13	Otto C. Gsantner	16.56	20.30	15.40	16.30	11.80	16.38	16.70	1.41	112.03
14	Clarence C. Willis	16.44	20.72	14.35	14.10	11.84	19.56	15.65	1.48	111.18
15	Joseph H. Pendleton	17.28	20.09	14.65	14.00	12.56	18.06	14.85	1.52	109.97
16	John C. Leonard	16.14	20.72	14.85	13.65	11.08	19.02	14.65	0.77	109.34
17	Robert B. Higgins	15.84	19.67	16.00	15.80	11.08	16.68	15.05	0.95	109.17
18	Ward P. Winchell	15.54	18.62	15.15	16.70	10.96	16.32	14.85	1.20	106.94
19	Charles H. Howland	17.58	17.50	13.85	14.35	10.84	18.42	15.20	1.07	106.67
20	Daniel D. Gladstone	15.54	19.11	14.60	14.35	10.68	17.10	14.50	1.56	104.32
21	Walter R. Addicks	15.42	18.27	14.80	15.10	10.48	18.12	13.30	1.70	103.79
22	Harry G. Leopold	15.00	19.46	14.15	14.95	11.76	15.90	13.10	1.63	102.69
23	Frederick E. Coley	15.00	17.64	13.45	14.40	10.32	15.54	14.50	1.69	99.16
†	Edward K. Taylor	15.84	16.73	14.10	14.20	10.48	16.08	14.10	0.63	100.90
†	Isaac H. Quinby	14.52	18.48	13.50	14.75	10.08	15.30	15.80	1.69	100.74
†	Thomas A. W. Shock	13.08	17.99	13.40	13.30	9.04	15.72	12.80	0.54	94.79
	Sadanori Youchi	12.72	15.40	14.35	14.95	7.08	12.18	....	0.09	76.59
	Henry L. Simpson	15.00	*a*	*a*	14.35	*a*	*a*	*a*	1.11	....

CADET-ENGINEERS.

Merit-roll of fourth class (25 *members*), *annual examination, June*, 1880.

Order of annual merit.	Name.	Mathematics.	Mechanical drawing.	English and history.	French.	Conduct.	Aggregate.
	Maxima	**36**	**12**	**20**	**8**		**76**
*1	**Charles E. Woodruff**	35. 46	9. 51	17. 55	6. 36	0. 26	68. 62
*2	**Samuel W. Armistead**	34. 11	9. 72	17. 35	6. 30	0. 14	67. 34
*3	**William J. Baxter**	33. 21	9. 48	18. 40	6. 22	0. 16	67. 15
*4	**John M. Ellicott**	33. 66	9. 48	17. 25	6. 92	0. 20	67. 11
*5	**Charles P. Eaton**	33. 21	9. 18	16. 90	7. 10	0. 19	66. 20
6	Charles E. Barnes	31. 77	9. 27	17. 75	5. 96	0. 27	64. 48
7	William F. Darrah	31. 05	9. 18	16. 75	6. 60	0. 26	63. 32
8	Charles W. Dyson	30. 96	9. 06	16. 35	5. 52	0. 26	61. 63
9	George F. Zinnell	29. 79	9. 21	16. 70	5. 62	0. 20	61. 12
10	George W. Littlehales	28. 44	8. 85	17. 25	5. 70	0. 16	60. 08
11	William S. Aldrich	30. 24	9. 96	13. 65	5. 36	0. 09	59. 12
12	Alexander S. Halstead	28. 71	8. 94	15. 95	5. 80	0. 33	59. 07
13	Harry A. Field	28. 53	8. 55	14. 10	5. 40	0. 04	56. 54
14	Charles J. Gross	27. 54	9. 30	13. 85	6. 08	0. 30	56. 47
15	William B. Carswell	27. 09	8. 82	15. 25	5. 28	0. 39	56. 05
16	Charles F. Webster	27. 54	8. 49	14. 30	5. 28	0. 65	54. 96
17	Harry A. Gillis	25. 65	8. 55	13. 85	5. 76	0. 47	53. 34
18	Philip J. Ryan	26. 28	8. 46	13. 70	5. 12	0. 77	52. 79
19	Julius Ellenger	26. 01	8. 16	14. 25	4. 78	0. 74	52. 46
20	William H. Lawrance	24. 12	9. 12	13. 05	5. 00	0. 33	50. 96
†	William C. Herbert	26. 28	7. 95	13. 40	5. 38	0. 65	52. 36
†	James E. Palmer	25. 83	9. 15	12. 10	5. 06	0. 26	51. 88
†	Eustace S. Glasscock	25. 11	7. 56	13. 95	5. 00	0. 51	51. 11
†	Marius Duvall, jr	23. 67	8. 67	12. 45	4. 72	1. 01	48. 50
‡	Thomas P. Pattison	*a*	*a*	*a*	*a*	0. 04	

REGULATIONS

GOVERNING

THE ADMISSION OF CANDIDATES INTO THE NAVAL ACADEMY AS CADET-MIDSHIPMEN.

NOMINATION.

I. The number of Cadet-Midshipmen allowed at the Academy is one for every Member and Delegate of the House of Representatives; one for the District of Columbia; nd ten appointed at large. According to the act of Congress approved June 17, 878, "There shall not be at any time more in said Academy appointed at large than en." As it will take some time before the number now at the Academy can be reuced to ten, there will be no appointment at large for at least two years to come.

II. The nomination of candidates for admission from the District of Columbia and t large is made by the President. The nomination of a candidate from any Congresional district or Territory is made on the recommendation of the Member or Delegate rom actual residents of his district or Territory.

III. Each year, as soon after the 5th of March as possible, Members and Delegates ill be notified in writing of vacancies that may exist in their districts. If such Memers or Delegates neglect to recommend candidates by the 1st of July in that year, the ecretary of the Navy is required by law to fill the vacancies existing in districts actally represented in Congress. They will be filled by appointments from the districts n which the vacancies exist.

IV. The nomination of candidates is made annually between the 5th of March and he 1st of July. Candidates who are nominated in time to enable them to reach the cademy on the 11th of June will receive permission to present themselves at that ime to the Superintendent of the Naval Academy, for examination as to their qualications for admission. Those who are nominated prior to July 1, but not in time to ttend the June examination, will be examined on the 22d of September following; nd should any candidate fail to report, or be found physically or mentally disqualified for admission, in June, the Member or Delegate from whose district he was nomnated will be notified to recommend another candidate, who shall be examined on he 22d of September following. When any of the dates assigned for examinations all on Sunday, the examination will take place on the following Monday.

V. A sound body and healthy constitution, good mental abilities, a natural aptitude or study and habits of application, persistent effort, an obedient and orderly disposiion, and correct moral principles and deportment, are so necessary to success in puruing the course at the Academy, that persons conscious of any deficiency in these espects are earnestly recommended not to subject themselves or their friends to the ortification and disappointment consequent upon failure, by accepting nominations nd attempting to enter a service for which they are not fitted.

Students from the Empire of Japan are received for instruction under a resolution f the Senate and House of Representatives of the United States approved July 27, 868.

EXAMINATION.

VI. Each candidate for appointment as Cadet-Midshipman must present to the Academic Board satisfactory testimonials of good moral character, and must certify *on honor* to his precise age, which must be over fourteen and less than eighteen years at the time of the examination. No candidate will be examined whose age does not fall within the prescribed limits.

VII. Candidates must be physically sound, well formed, and of robust constitution; they will be required to pass a satisfactory examination before a medical board composed of the surgeon of the Naval Academy and two other medical officers to be designated by the Secretary of the Navy.

VIII. Any *one* of the following conditions will be sufficient to cause the rejection of a candidate:

Feeble constitution, inherited or acquired;

Greatly retarded development;

Permanently impaired general health;

Decided cachexia, diathesis, or predisposition;

All chronic diseases or results of injuries that would permanently impair efficiency, viz:

Weak or disordered intellect;

Cutaneous and communicable diseases;

Unnatural curvature of spine, torticollis, or other deformity;

Permanent inefficiency of either of the extremities or articulations from any cause;

Epilepsy or other convulsions within five years;

Impaired vision or chronic disease of the organs of vision;

Great hardness of hearing or chronic disease of the ears;

Chronic nasal catarrh, ozæna, polypi, or great enlargement of the tonsils;

Impediments of speech to such an extent as to impair efficiency in the performance of duty;

Chronic diseases of heart or lungs or decided indications of liability to cardiac or pulmonary affections;

Hernia or retention of testes in inguinal cavity;

Sarcocele, hydrocele, stricture, fistula, or hæmorrhoids;

Large varicose veins of lower limbs, scrotum, or cord;

Chronic ulcers.

Attention will also be paid to the stature of the candidate, and no one *manifestly* under size for his age will be received at the Academy. In the case of doubt about the physical condition of the candidate, any marked deviation from the usual standard of height will add materially to the consideration for rejection. Five feet will be the minimum height for the candidate.

The board will exercise a proper discretion in the application of the above conditions to each case, rejecting no candidate who is likely to be efficient in the service and admitting no one who is likely to prove physically inefficient. No candidate rejected by the board will be allowed a re-examination.

IX. The candidates must pass a satisfactory examination before the Academic Board in reading, writing, spelling, arithmetic, geography, and English grammar.

X. All the examinations, except in reading, will be written. Candidates who fail below the standard will receive a second and final examination in the subjects in which they fail. Deficiency in any one of the subjects at the second examination will be sufficient to insure rejection.

XI. "Candidates rejected at such examinations shall not have the privilege of another examination for admission to the same class unless recommended by the Board of Examiners."—(*Rev. Stat.*, § 1515.)

GENERAL CHARACTER OF THE QUESTIONS.

XII. ARITHMETIC.—*Notation and numeration.*—The candidate is required to express in figures any whole number, decimal, or mixed number, to write in words any given number, and to explain the Roman and Arabic systems of notation.

Denominate numbers.—The tables of money, weights, and measures in common use, cluding English money; addition, subtraction, multiplication, and division of de- ominate numbers; the relation existing between the troy and avoirdupois pound; umber of cubic inches in a gallon; reduction of differences of longitude to their uivalents in time, and *vice versa.*

Fractions.—The candidate must be familiar with all the processes of common and ecimal fractions, and is expected to give clearly the reasons for such pro- esses, and to be familiar with the contracted methods of multiplication and division iven in the ordinary text-books on arithmetic.

Properties of numbers.—Test of divisibility of numbers by 2, 3, 5, 8, 9, 11, 25, 125, &c.; he resolution of composite numbers into prime factors; the method of determining hether any number is prime or composite, and of finding the greatest common divi- or and the least common multiple of large as well as of small numbers.

Ratio and proportion.—Definitions and explanations of the nature of ratio and pro- ortion; different methods of writing a proportion; solution of problems in simple nd compound proportion.

Percentage, interest, and discount.—Examples usually given under these heads in rithmetic.

Mensuration.—The measurement of rectangular surfaces and volumes.

Evolution.—The extraction of square and cube roots.

Analysis.—Miscellaneous problems usually classed under this head, similar to those ound in school arithmetics. It is essential that the candidate should be thoroughly roficient in all branches of arithmetic; unusual excellence in this will be allowed to ount in his favor in case of a slight deficiency in other subjects.

Should persons intending to present themselves as candidates acquire a knowledge f algebra, it will be found to be of material assistance in the course of study pursued t the Academy, although not required for admission.

When practicable, should the candidate so prefer, algebraic solutions of problems ay be substituted for arithmetical solutions.

GEOGRAPHY.—Candidates will be questioned on the grand divisions of the land and ater; the character of coast-lines; the direction and position of mountain-chains and he locality of important peaks; the position and course of rivers, their tributaries, nd the bodies of water into which they empty; the position of important seas, bays, gulfs, and arms of the sea; the political divisions of the land, their position, bound- ries, and capital cities; the position and direction of great peninsulas, and the situ- tion of important and prominent capes; straits, sounds, channels, and the most mportant canals; great lakes, and inland seas; position and political connection of im- ortant islands and colonial possessions; locality of cities of historical, political, or commercial importance (attention is specially called to the rivers and bodies of water n which cities are situated); the course of a vessel in making a voyage between well known sea-ports.

GRAMMAR.—Candidates will be examined in the whole of English grammar as treated in the common-school text-books, embracing the following subjects: The divisions of letters and the use of capitals; the parts of speech; the classification of *nouns*, and the distinctions of person, gender, and number; under *number*, the rules for the formation of the plural, nouns irregular and defective in number, the plural of proper names; under *case*, the different uses of the three cases, the rules for inflection, the changes in ending to denote case; the difference between the definite and indefinite *article*, and the use of *a* or *an;* the classification of *adjectives;* the explanation of the different degrees of comparison; the rules for *comparing adjectives;* irregular and defective comparison; numerals and their classification; the double classification of *pronouns*, first, into substantives and adjectives; secondly, into personals, relatives, &c.; peculiarities in the use of personal pronouns, as the difference between *my* and *mine*, between *thou* and *you*, and the various uses of *it;* compound personal pronouns; the double office of relatives, and the different classes of objects to which each of them is applied; compound relative pronouns; interrogative pronouns; adjective pronouns, or pronominal adjectives, and their classification; the classification and conjugation of *verbs;* the relations between transitive and intransitive verbs; the principal parts of regular, irregular, and defective verbs; the uses and inflection o auxiliaries; the essential peculiarities in the use of voice, mood, tense, number, and person; tense endings and personal endings; impersonal verbs; the classification formation, and comparison of *adverbs;* conjunctive adverbs; the use of *prepositions* *interjections,* and *conjunctions,* with the classification of the latter.

The rules for the construction and arrangement of words and sentences, given under syntax.

Parsing, according to the following model; giving in the case of each word the explanation of its grammatical relation to the other words in the sentence.

Noun: Class, gender, number, person, case.

Article: Definite or indefinite; qualified noun.

Adjective: Class, compared or not compared; comparison, if admitting it; degree of comparison; qualified noun.

Personal pronoun: Person, gender, number, case.

Relative pronoun: Person, gender, number, case, antecedent.

Interrogative pronoun: Gender, number, case.

Adjective pronoun (or pronominal adjective): Class; qualified word.

Verb: Class, form, principal parts, tense, mood, voice, person, number, subject.

Adverb: Class, derivation and comparison, if derived and compared; qualified word.

Preposition: Words between which the relation is shown by the preposition.

Interjection: The kind of emotion expressed.

Conjunction: Class; words or sentences connected.

READING.—Candidates will be examined in reading aloud English prose.

WRITING AND SPELLING.—Candidates will be required to write a short original letter, and an exercise in dictation, and to spell twenty-four words in common use.

An examination in English branches containing eight or more mistakes in spelling will not be considered satisfactory, and will be sufficient of itself to cause the rejection of the candidate.

ADMISSION.

XIII. Candidates who pass the physical and mental examinations will receive appointments as Cadet-Midshipmen, and become inmates of the Academy. Each cadet will be required to sign articles by which he binds himself to serve in the United States Navy eight years (including his time of probation at the Naval Academy), unless sooner discharged. The pay of a Cadet-Midshipman is $500 a year, commencing at the date of his admission.

XIV. Cadets, immediately after their admission, will supply themselves with the following articles; viz.,

One parade-suit	$37 72	* Eight pairs socks	$1 84
One undress-suit	20 95	* Four pairs drawers	2 24
One working-suit	2 42	* Six handkerchiefs	1 38
One overcoat	23 30	* Eight towels	2 00
One rubber coat	3 68	Two pairs drill-gloves	2 26
One pair rubber leggings	1 05	Two pairs Lisle-thread gloves	50
Two pairs white duck leggings	2 34	* One pair suspenders	38
One pair gymnastic slippers	92	One neck-tie	50
One parade-cap	3 69	Two clothes-bags	50
One undress-cap	1 71	One hair mattress	6 68
* Two pairs high shoes	11 50	One straw mattress	1 32
* Eight white shirts	10 16	One hair pillow	93
* Two nightshirts	1 76	One pair blankets	3 78
* Four undershirts	2 24	Two bedspreads	2 24
Twelve linen collars	1 68	Six sheets	3 66

our pillow-cases	$1 00	One pass-book	$0 27
One tooth-brush	22	One stencil and ink; 1 brush	41
One hair-brush	73	One bottle indelible ink	17
One whisk	23	One rug	1 55
One coarse comb	10	One wash-basin and pitcher	1 05
One fine comb	31	One looking-glass	95
ne mug	09	One water-pail	70
One cake soap	10	One slop-bucket	70
ne soap-dish	09	One broom	27
ne requisition-book	32		
ne laundry-book	27	Total	164 86

The articles marked *, not being required to conform to a standard pattern, may be rought by the cadet from home, but all other articles must conform to the regulaons, and must, therefore, be supplied by the storekeeper.

Each Cadet-Midshipman must, on admission, deposit with the paymaster the sum f $20, for which he will be credited on the books of that officer, to be expended, by irection of the Superintendent, in the purchase of text-books and other authorized rticles besides those enumerated in the preceding article.

All the deposits for clothing and the entrance-deposit of twenty dollars must be ade before a candidate can be received into the Academy.

SUMMARY OF EXPENSES.

eposit for clothing	$164 86
eposit for books, &c	20 00
Total deposit required	184 86

The value of clothing brought from home is to be deducted from this amount.

Each Cadet-Midshipman, *one month after admission*, will be credited with the amount f his actual expenses in traveling from his home to the Academy.

XV. A Cadet-Midshipman who voluntarily resigns his appointment within a year of he time of his admission to the Academy will be required to refund the amount paid im for traveling expenses.

R. W. THOMPSON,
Secretary of the Navy.

EXAMINATION OF CANDIDATES FOR ADMISSION AS CADET-MIDSHIPMEN, 1880.

ARITHMETIC.

SEPTEMBER, 1880.—*Time allowed, three hours.*

1. What is the rule for dividing one decimal by another? Explain *why* you point off as stated in the rule. Divide .046 by .00762089 to four decimal places.

2. Add together 1.465, .0095, 37.15, 28.457, and 16.1685, and divide the sum by .0296. Divide 345 lbs. 9 oz. 16 dwts. 20 grs. by $13\frac{5}{7}$.

3. Simplify $2 \quad + \frac{5}{2}$ of $\frac{7}{3\frac{4}{5}} - \frac{1\frac{2}{3}}{2\frac{1}{2}} \Big\} \div 1\frac{77}{228}$.

4. Take $\frac{4}{33}$ of £4 10*s.* 9*d.* from £6 6*s.* 9*d.* What simple fraction *in its lowest terms* is equivalent to $\frac{17s.\ 7\frac{3}{4}d.}{£11\ 9s.\ 2\frac{1}{4}d.}$?

5. Having several numbers already separated into their prime factors, what factors would you select to form (1) the greatest common divisor; (2) the least common multiple?

6. Separate each of the following numbers into its prime factors, and find their least common multiple (not to be multiplied out): 13500, 49392, 45375, 27027, and 11022011.

7. Given that one metre = 39.37079 inches, that one kilogramme = 2.20462 pounds, and that a gun throws a shot of 134 pounds $5\frac{1}{2}$ ounces a distance of 4,875 yards; express the weight of the shot in kilogrammes and the range in metres.

8. A box with a lid measures externally 16 inches each way, and the wood of which it is made is 1 inch thick; what would be the weight of the box when filled with paper, a cubic foot of paper weighing 792 ounces and a cubic foot of wood 840 ounces?

9. Find the square root of .818 to seven decimal places.

10. The length of the year is 365 days 5h. 48m. 48sec. Express this as days and decimals to seven places. What would have been the date to-day (September 24) if from the beginning of the Christian era no leap years had been introduced?

ENGLISH BRANCHES.

JUNE, 1880.—*Time allowed, three hours.*

GRAMMAR.

1. Decline (or inflect) *who, I, country, beef, chimney.*

2. Give the principal parts of *lead, burst, strive, blow, catch, cleave, fall, fell.*

3. Name the adverbs corresponding to *shy, able, cruel, worthy.* What is an intransitive verb? a participle? gender?

4. Correct the following, and state why any of the words are wrong: "If you act fair, you will give the same help to him and I. When I had set down on the bench, a man come up and said, 'Why do you lay there for such a awful long time?'"

5. Parse the words in italics:

"*It is not at once that* the inhabitants *of a great city, accustomed* to the *sight* of *well-stored* shops, *begin to realize* the *idea* of scarcity."

SPELLING.

pology.
rmistice.
eneficial.
ountenance.
enace.
ecommend.
Compliance.
Subservient.
Dissension.
Unforeseen.
Malicious.
Autograph.
Financier.
Gross.
Perpetrate.
Confessor.
Exhaust.
Penetrate.
Levy.
Sponsor.
Antiquated.
Equivocal.
Icicle.
Bayonet.

GEOGRAPHY.

1. Where is the White Sea? Black Sea? Red Sea? Yellow Sea?

2. Where is Ancona? Sydney? Batavia? Salonica? Chattanooga?

3. Name the rivers on which the following cities are situated, tell which of them re capitals, and name the States in which they are: 1. Monte Video. 2. Liverpool. . Vienna. 4. Saint Paul. 5. Cincinnati.

4. Describe the following rivers, telling where they rise, in what direction they ow, and into what water they empty: 1. Cumberland. 2. Godavery. 3. Oder. 4. rinoco. 5. Columbia.

5. Fix the position of the following and tell to what nation each belongs: 1. Canary slands. 2. Cochin China. 3. Mauritius. 4. Corsica. 5. Hong-Kong.

RE-EXAMINATION.

ARITHMETIC.

SEPTEMBER, 1880.—*Time allowed, three hours.*

1. Divide .1 by .01, .01001 by .001, 99 by .0009, and 8886.66 by .00037. What decimal art is .033251 of 32.44?

2. How many bars of gold, each weighing 5 oz. 13 dwts. 21 grs., can be made from bar weighing 88 lbs. 8 oz. 14 dwts. 15 grs.?

3. Multiply the sum of $\frac{1}{2}$, $1\frac{3}{7}$, and $\frac{5}{6}$ by the difference of $\frac{4}{15}$ and $\frac{3}{20}$, and divide the roduct by $\frac{11}{18}$ of $1\frac{14}{15}$.

4. Multiply together $\frac{5687}{319}$, $\frac{667}{22011}$, $\frac{221}{669}$, and $\frac{72816}{8528}$, cancel all the factors you can, and ive the result in its simplest form.

5. State the rule for finding the greatest common divisor of two numbers when the umbers are so large that you cannot find their prime factors; explain the rule, *i. e.*, ive reasons for it.

6. Find the greatest common divisor of 93883 and 167027.

7. A square field contains 3 acres 1 rood 13 poles $5\frac{2}{3}$ square yards; find the length f a side.

8. How much will it cost to carpet a square room, whose side is 17 feet 6 inches, with arpet 2 feet 4 inches wide, at 3*s.* 9*d.* per yard?

9. Supposing that the limited express runs 40 miles an hour and an ordinary train 0 miles an hour, and that the express fare is 1 cent per mile more than the ordinary are; find how much an hour a man's time is worth if it costs him the same to travel y one as by the other.

ENGLISH BRANCHES.

JUNE, 1880.—*Time allowed, three hours.*

GRAMMAR.

I.

Parse the words in italics in the following passage: "I know *you do* not *like* trouble, ut I *have ventured*, *notwithstanding*, to make you the *executor* of my will. *There* will ot be *much to do*, as there is no *money*. There is a little bequest, *having* reference to y wife, *that* you *might like* to execute."

II.

Correct and point out the faults in the following passage: "He ain't a bit sorry h done it, and there arn't no use in talking about those kind of things. No one whic has any regard for himself would start for the Arctic regions in February. John h wanted to do this, but it seemed to me sort of foolish, and when I heard tell of it, talked to him, but he acted like he was mad."

III.

1. Give the principal parts of *shed*, *slay*, *bring*, *sing*, *sink*, *drown*.

2. Give the superlative of *shy*; of *lovely*; of *inconvenient*. Give the positive of *elde* *worse*, *last*, *next*.

3. Inflect (or decline) *hero*, *dwarf*, *leaf*, *treaty*.

SPELLING.

Artificial.
Mitten.
Congregate.
Subscription.
Liquor.
Commodity.

Machinery.
Electricity.
Literary.
Disagreeable.
Excellent.
Prosecutor.

Channel.
Salmon.
Whereabouts.
Volley.
Conscientious.
Corroborate.

Treble.
Cemetery.
Pestilence.
Proficient.
Artifice.
Pioneer.

GEOGRAPHY.

1. Where, and on what water, is Smyrna? Newcastle? Austin? Asuncion? Limerick?

2. From what part of what country and into what water do the following capes project? 1. Cape Clear. 2. Cape St. Roque. 3. Cape St. Vincent. 4. Cape May. 5 Cape Race.

3. Describe the following rivers, telling where they rise, in what direction they flow and into what water they empty: 1. Red River. 2. Orange River. 3. Don River. 4 Tigris River. 5. Clyde River.

4. Name three seaports on the east coast and three on the west coast of Sout America, and fix the position of each.

5. Fix the position of the following, and state to what country or countries eac belongs, naming a town in each place: 1. Iceland. 2. Guiana. 3. Jamaica. 4. Azore 5. Philippine Islands.

REGULATIONS

FOR THE

PPOINTMENT OF CADET-ENGINEERS IN THE UNITED STATES NAVY.

I. In pursuance of law, applications will be received by the Navy Department for e appointment of Cadet-Engineers.

II. The application is to be addressed to the Secretary of the Navy, and can be made the candidate or by any person for him, and his name will be placed on the regis- . The registry of a name, however, gives no assurance of an appointment, and no eference will be given in the selection to priority of application.

III. The number of appointments which can be made is limited by law to twenty- e each year. The candidate must not be less than sixteen or more than twenty ars of age; he will be required to certify *on honor* to his precise age, to the Academic ard, previously to his examination, and no one will be examined who is over or under e prescribed age. His application must be accompanied by satisfactory evidence of od moral character and health, with information regarding date of birth and educa- nal advantages hitherto enjoyed. Candidates who receive permission will present emselves to the Superintendent of the Naval Academy on the 15th of September for amination as to their qualifications for admission.

IV. The course of study will comprise four years at the Naval Academy, and two ditional years at sea. All Cadets who finally graduate will be commissioned Assist- t Engineers in the Navy as vacancies occur. The pay of a Cadet-Engineer while at e Naval Academy is $500 per annum.

V. The academic examination previous to appointment will be competitive, and will on the following subjects, namely: Arithmetic; algebra, through equations of the st degree; plane geometry; rudimentary natural philosophy; reading; writing; elling; English grammar; English composition; geography; free-hand drawing; d an elementary knowledge of the principles governing the action of the steam-en- ne. Candidates who possess the greatest skill and experience in the practical knowl- ge of machinery, *other qualifications being equal,* will have precedence for admission.

VI. The examination before the Medical Board is the same as that of candidates for pointment as Cadet-Midshipmen. See p. 60.

The following deposits must be made before a candidate can be received into the ademy:

r clothing (see p. 62)	$164 86
r books and drawing instruments	50 00
Total	214 86

VII. Persons who contemplate presenting themselves as candidates for admission as det-Engineers are cautioned that the number of applicants is large, and the compe- ion exceedingly close. It is, therefore, useless for candidates to present themselves less well prepared on the subjects of the examination, and unless their physical alifications are within the prescribed standard.

COMPETITIVE EXAMINATION OF CANDIDATES FOR APPOINTMENT AS CADET-ENGINEERS, SEPTEMBER, 1880.

Number of competitors, 167.

ARITHMETIC.

Time allowed, three hours.

1. Divide 723 by .0000241; divide .000368 by 184000; reduce .000579625 to a cor mon fraction in its lowest terms. What fraction of £2 19*s.* 6*d.* must be added $\frac{3\frac{1}{2}}{4\frac{1}{8}}$ of ($3\frac{3}{7}+1\frac{2}{5}$) of 13*s.* $1\frac{1}{2}$*d.* to make the sum equal to £3 5*s.*?

2. Multiply together $1\frac{3}{11}$, $\frac{9}{14}$, $\frac{4}{7}$, $9\frac{5}{12}$, $\frac{6}{113}$. Express 14*s.* 1*d.* as the decimal of £2 3 4*d.* A tradesman's prices are 15 per cent. above cost price; if he allows a discount $2 on a bill of $46, what per cent. of profit does he make? Find the interest on £1,1 13*s.* 9*d.* for 191 days at $5\frac{1}{4}$ per cent. (365 days to the year).

3. Given the prime factors of several numbers, explain how you would form from the (1) the greatest common divisor, (2) the least common multiple. Separate each of tl following numbers into its prime factors: 1001, 289289, 2499, 2197, 11109, and 252 The greatest common divisor of two numbers is 13 × 21 the least common multiple 99 × 49 × 169, and one of the numbers is 39039. Find the other number.

4. At 19 cents per square yard, what will be the cost of painting the four walls a room, length 20 feet $10\frac{1}{4}$ inches, breadth 15 feet $1\frac{3}{4}$ inches, height 10 feet 3 inche Find the square root of 818 to seven decimal places.

5. On what day of the week will the 21st of September fall in the years 1980 a 2080? After how many exact centuries from to-day will the 21st of September aga fall on Tuesday? Give a full explanation of the calculations by which you obta your results in this question. Add together $\frac{7}{2431}$, $\frac{8}{2717}$, $\frac{10}{4199}$. Reduce $.5\dot{2}2477\dot{5}$ to common fraction.

6. On the 21st of September, 1880, you buy five notes for which you agree to p such a sum that you may receive 8 per cent. per annum on your investment. T notes are for $100 each, they were all given on March 21, 1880, and they bear intere at 6 per cent. *payable annually;* the notes fall due as follows: (1) March 21, 1881, (March 21, 1882, (3) March 21, 1883, (4) March 21, 1884, (5) March 21, 1885; how mu should you pay for the notes?

ALGEBRA.

Time allowed, three hours.

1. Divide

$$(ax+by)^3+(ax-by)^3+(bx-ay)^3+(bx+ay)^3 \text{ by } (a+b)^2\,x^2-3\,ab\,(x^2-y^2).$$

Separate into factors $(aB+bA)\,(cD+dC)-(aD+bC)\,(cB+dA)$.

2. Find the greatest common divisor of $2x^3+6x^2+9x+27$ and $x^3+10x^2+33x+3$ Multiply $x+14\sqrt{x}+48$ by $x-12\sqrt{x}+35$ and divide the product by $x+\sqrt{x}-30$.

3. Simplify $\frac{3\,bcq+30\,mp+18\,bc+5\,mpq}{4\,adq-42\,fk+24\,ad-7\,fkq}$. Find the square root of $9+6\sqrt{2}$ a of $x^6+\frac{1}{x^6}-2x^4+x^2-\frac{2}{x^2}+2$.

4. Solve the equations

$$\frac{30+6x}{x+1}+\frac{60+8x}{x+3}=14+\frac{48}{x+1},$$

$$\frac{1}{a\,(b-x)}+\frac{1}{b\,(c-x)}=\frac{1}{ac-ax}, \text{ and}$$

$$x+y+z=6,\ 2x+3y+4z=20,\ 3x+4y+6z=29.$$

5. If $x=y+\frac{1}{z}$ and $y=z+\frac{1}{x}$, prove that $z=x-\frac{2}{y}$. A person traveling on a rail-
y counts the number of telegraph posts that he passes during 1½ minutes; this
mber is equal to the number of miles he travels in half an hour; find the distance
tween two consecutive posts.

6. In the equation $12y^2+7xy-12x^2+20y+110x-600=0$, substitute $(y-2)$ for
and $(x+4)$ for x: in the resulting equation put $\frac{3x+4y}{5}$ in place of y, and $\frac{4x-3y}{5}$ in
ace of x, and reduce the result to its simplest form. How could the final result be
tained from the first equation by a single substitution? Prove this.

GEOMETRY.

Time allowed, two hours and a half.

1. Prove that the angles at the base of an isosceles triangle are equal, and that if
e equal sides be produced the angles on the other side of the base will be equal.
BC is an isosceles triangle, BC the base; if the angles ABC and ACB be bisected
the lines BE and CD, respectively meeting AC and AB in E and D, prove that
e straight lines BD, DE, and EC will be equal to each other.

2. Prove that the angle at the centre of a circle is double the angle at the circum-
ence on the same arc. AB and CD are two chords of a circle which intersect,
hen produced, in the point E, without the circle; prove that the difference of the
gles subtended at the centre of the circle by the arcs AC and BD is double the
gle AEC.

3. Inscribe a square and an equilateral triangle in a circle and explain the con-
uction. If AB be the side of the square, and AD the side of the triangle, prove
at $3\overline{AB}^2=2\overline{AB}^2$.

4. A straight line BC is divided in G, and on BC and BG, on opposite sides of BC,
e described the squares $ABCD$ and $BEFG$: A point P is taken between A and B,
that $EP=AB$, and PF is joined. The parallelogram $FPDN$ is drawn: show
at it is a square equal to the sum of the other two, and that the triangles PAD and
CN are equal in all respects.

5. Find the length of the side of a regular octagon, inscribed in a circle of radius a.
ove that if circles be described with the corners of a square as centres, with a
dius equal to one-half of the diagonal, the points where these circles cut the sides of
e square will be the vertices of a regular octagon.

NATURAL PHILOSOPHY.

Time allowed, three hours.

1. Give the laws of gravitation.

A ball weighs 1,470 pounds at the surface of the earth; what would it weigh 10,000
iles above the surface, the radius of the earth being 4,000 miles?

2. A body falls 357.23 feet in 4 seconds; what was its initial velocity, the measure
the force of gravity being 32.16?

A body falls from a certain height, and 3 seconds after it has started, another body
lls from the height of 787.92 feet; from what height must the first fall if both are to
ach the ground at the same instant?

3. What is the horse-power of an engine that can raise 1,500 pounds 2,376 feet in 3
inutes?

A railway car weighing 10 tons is moved 50 feet from rest and acquires a velocity of
miles per hour; determine the work expended on the car in foot-pounds, the resist-
nce due to friction being 8 pounds per ton.

4. A stone is thrown horizontally from the top of a tower 257.28 feet high with a
elocity of 60 feet a second; where will it strike the ground?

Find the energy of a 25-pound ball that has fallen 3,600 feet in a non-resistant
edium.

5. If 5 quarts of water weigh as much as 7 quarts of alcohol, find the specific gravity of alcohol.

A piece of cork weighing 2.3 grains was attached to a piece of iron weighing 38.9 grains, both were found to weigh in water 26.2 grains, the iron alone weighing 33.9 grains in water; required the specific gravity of the cork.

6. A weight of 12 pounds, hanging from one end of a five-foot lever, considered as having no weight, balances a weight of 8 pounds at the other end; find how far the fulcrum must be moved in order that the weights may balance when each is increased by 2 pounds?

If a two horse-power engine can just throw 1,056 pounds of water to the top of a steeple in two minutes, what is the height of the steeple?

7. A ship passing from the sea into a river discharges 44,800 pounds of cargo, and is found to sink in the river to the same mark as in the sea; the specific gravity of sea-water being 1,028, find the weight of the ship and cargo.

A body weighing 12 pounds (sp. gr., $\frac{1}{5}$) is fastened to the bottom of a vessel by a cord; water being poured in until the body is covered, find the tension of the cord.

How high could a liquid with a specific gravity of 1.35 be raised by a lifting-pump when the barometer stands 29.5 inches, the specific gravity of mercury being 13.6?

8. If the capacity of the barrel of an air-pump is $\frac{1}{4}$ that of the receiver, what part of the air will remain in the receiver at the end of the fourth stroke of the piston?

A hollow copper sphere whose internal diameter is 2 feet, just floats in water; find the thickness, the specific gravity of copper being 8.788.

ENGLISH BRANCHES.

Time allowed, three hours.

GRAMMAR.

1. (*a*) Give the possessive, singular and plural, of *hoof, moss, folio, race, thief.* (*b*) What is meant by the mood or mode of a verb? Name the moods and explain the use of any two of them.

2. (*a*) "I know what I am doing." State what two classes of pronouns are represented by *what.* (*b*) "The man that I saw yesterday said that that horse was sold." Explain the different uses of *that.* (*c*) Correct the following sentences, and show why they are wrong: 1. Who did she marry? 2. Three-fourths are more than one-half. 3. It is the duty of everyone to be careful of their reputation. 4. They were both unfortunate, but neither of them were to blame.

3. Parse the words in italics in the following: "He observed, *that* even *if every charge* against him *had been* fully *proved, still, all together did* not, *according to* any *known* law, *amount* to a capital *crime.*"

SPELLING.

Delegation.
Inalienable.
Counterbalance.
Quarantine.
Inveigle.
Courtesy.

Precursor.
Synagogue.
Pusillanimous.
Conscience.
Euphonious.
Predecessor.

Typical.
Installation.
Sorcery.
Nuptial.
Fustian.
Hoax.

Incendiary.
Bludgeon.
Disagreeable.
Coercion.
Missionary.
Effete.

GEOGRAPHY.

1. Where and on what water are the following cities? 1. Antwerp. 2. Astrachan. 3. Bagdad. 4. Nashville. 5. Fredericton.

2. Give the source, direction, and mouth of the following rivers: 1. Altamaha. 2. Congo. 3. Amoo. 4. Niemen.

3. Fix the position of the following islands and state to what country each belongs. 1. Heligoland. 2. Santa Maura. 3. Barbadoes. 4. Funen.

4. Fix the position of the following and tell to what division of land or water the name refers: 1. Suez. 2. Marne. 3. Constance. 4. Mendocino. 5. Aconcagua.

5. Name in order the States of Europe bordering on the seacoast, and give the capital of each, and the name of one other principal city.

COURSE OF INSTRUCTION.

DEPARTMENT OF SEAMANSHIP.

SEAMANSHIP.*—Description of all kinds of rope, and its practical manipulation for all purposes on shipboard; measuring for and fitting standing and running rigging; masting, sparring, and rigging ship; getting on board and stowing a vessel's outfit; organizing a ship's company; the fittings of boats; the management of boats under all circumstances; evolutions of vessels at sea and in harbor; repair of spars and rigging in cases of accident; duties of officers at sea and in port; rules of the road; wind and weather.

Text-book.—Luce's Seamanship, with lectures and illustrations from models.

SHIP-BUILDING.

Text-books.—Thearle's Naval Architecture and Wilson's Ship-Building, with lectures illustrated by models and drawings.

NAVAL TACTICS.*—Organization, formations, and maneuvering of a fleet, under steam or sail.

Text-books.—Manual of Naval Tactics (Ward); Steam Fleet Tactics (Parker); United States Naval Signal-Book; Manual of Signals (Myer).

PRACTICAL EXERCISES, consisting of—

SEAMANSHIP-DRILLS.*—Exercises on shipboard with sails and spars.

NAVAL TACTICS.*—Exercises in boats under oars and under sails.

SIGNALS.—Exercises in the use of signals according to Myer's Army Signal Code.

PRACTICAL SEAMANSHIP.*—Exercises on board the United States sloop-of-war Dale on Saturday mornings.

The instruction in boxing, gymnastics, swimming, and dancing is in charge of this department.

DEPARTMENT OF ORDNANCE AND GUNNERY.

PRACTICE AND THEORY OF GUNNERY.*—*Practical naval gunnery,* as laid down in the Ordnance and Gunnery Instructions for the United States Navy.

Preparation of gun-iron from crude ore, including the description and use of furnaces; manufacture of wrought-iron, steel, and bronze; fabrication of guns of all descriptions; manufacture of gunpowder and fuses, and of all kinds of projectiles and fire-works.

Theory of gunnery.—Motion of projectiles *in vacuo* and in the atmosphere; initial, remaining, and final velocities, and the methods of determining their values; the effect of variations of charge, windage, and weight of projectiles; deviation of projectiles; the several systems of pointing; tangent sights and determination of their values; penetration and shock of projectiles; and recoil of guns.

Text-books.—Cooke's Naval Ordnance and Gunnery; Ordnance Instructions, United States Navy; Gunnery Instructions, United States Navy.

INFANTRY TACTICS.*—Organization and formation of squad, company, and battalion; school of the soldier; company and battalion drill, including instructions for skirmishers and the bayonet exercise.

Text-books.—United States Infantry Tactics; Wingate's Rifle Practice.

PRACTICAL EXERCISES, consisting of—

INFANTRY-DRILL.

FIELD-ARTILLERY AND BOAT-HOWITZER EXERCISE.

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*Cadet Midshipmen only.

GREAT GUNS.—Exercises and target practice on board the United States ship Santee.

MORTAR-PRACTICE.

FENCING.—Exercises with small-swords and broadswords.

DEPARTMENT OF MATHEMATICS.

ALGEBRA.—Fundamental operations; reduction and conversion of fractional and surd quantities; involution and evolution; reduction and solution of equations of the first and second degrees; the summation of series; the nature, construction, and use of logarithms; the theory of equations.

GEOMETRY.—Plane and solid geometry; the mensuration of surfaces and volumes; the application of algebra to geometry.

TRIGONOMETRY.—Analytical investigation of trigonometric formulas, and their application to all the cases of plane and spherical trigonometry; the construction and use of trigonometric tables; the solution of trigonometric equations; trigonometric series.

ANALYTICAL GEOMETRY.—Equations of the right line, plane, and conic sections; discussion of the general equation of the second degree, involving two or three variables; determination of loci; principal problems relating to the cylinder, cone, sphere, and spheroids.

DESCRIPTIVE GEOMETRY.—The graphic illustration and solution of problems in solid geometry, and the application of the method, particularly to the projections of the sphere and to the construction of maps.

Text-books.—Ray's Higher Algebra; * Todhunter's Algebra for beginners; † Chauvenet's Geometry; * Wentworth's Geometry; † Chauvenet's Trigonometry; Church's Descriptive Geometry; Millar's Descriptive Geometry; * Todhunter's Conic Sections; Bowditch's Useful Tables.

ELECTIVE COURSES.

In addition to the above, Cadets of the third and fourth classes who display marked ability in mathematics are permitted to take an advanced course. The following are the elective courses for 1880–81.

Fourth class.—Algebra, the theory of equations, and curve-tracing.

Third class.—The elements of the differential and integral calculus, with applications to trigonometry and to geometry of two dimensions.

Text-books.—Todhunter's Algebra for Colleges and Schools; Todhunter's Theory of Equations; Rice and Johnson's Elements of the Differential Calculus.

DEPARTMENT OF STEAM-ENGINEERING.

MARINE ENGINES.—General theory of the steam-engine; classification and details of marine steam-engines, and of instruments and apparatus used in connection with them; the computation of the power and its cost; instruction in the duties of the engine-room watch and of the engineer division, by means of practical exercises on board the United States steamers Nantucket and Standish under way.

FABRICATION OF MACHINERY.*—The qualities and strength of materials, and the processes of manufacture, accompanied by practical exercises with the workshop methods and appliances for the conversion of the various materials into finished machinery.

DESIGNING OF MACHINERY.*—Pure mechanism, and the designing of boilers and engines, including valve-gears.

MECHANICAL DRAWING.*—The nomenclature of design; general and conventional practices of the art; the execution of plans, elevations, and sections; isometrical projections; shades, shadows, and linear perspective.

PRACTICAL EXERCISES.—The management of marine steam apparatus; [the use of tools and machines; hand-work of the machine-shop, pattern-shop, smithery, boiler-shop, and foundry.] *

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* Cadet-Engineers only. † Cadet-Midshipmen only.

Text-books.—Weisbach's Mechanics of Engineering, Vol. II *; Northcott's Steam-Engine †; Warren's Elements of Mechanical Drawing †; Goodeve's Elements of Mechansm; † Rankine's Machinery and Mill-Work; † Rankine's Steam-Engine and other Prime Movers; † Zeuner's Valve-Motion; † and Shelley's Workshop Appliances; † King's Lessons and Notes on the Steam-Engine.

DEPARTMENT OF ASTRONOMY, NAVIGATION, AND SURVEYING.

Astronomy.—Descriptive and practical astronomy, including the use of instruments, especially those used for determining terrestrial latitudes and longitudes; the solution of the astronomical triangle; the use of the Nautical Almanac.*

Text-books.—C. J. White's Astronomy; Theory of the portable Transit and the Zenith Telescope; Coffin's Navigation; * Bowditch's Navigator.*

Navigation.*—Theory and practice of navigation, the latter including instruction in the duties of the navigator, the use of navigating instruments, and their construction, with the solution of problems and the use of tables.

Text-books.—Coffin's Navigation; Howell's Mathematical Theory of the Deviations of the Compass; Bowditch's Navigator; Howell's Marine Surveying.

Surveying.*—The form of the earth, with special reference to the construction of charts; explanation of geodetical surveys; the solution of problems in nautical surveying, and practical work in surveying and constructing charts.

Text-book.—Howell's Marine Surveying.

DEPARTMENT OF PHYSICS AND CHEMISTRY.

Acoustics.—Theory of waves; the production and propagation of sound; the numerical evaluation of sound; modes of vibration; communication of vibrations; analysis of vibrations.

Optics.—The propagation, reflection, and refraction of light; lenses, vision, and optical instruments; spectrum analysis; color; the undulatory theory of light; polarization and double refraction.

Electricity and magnetism.—Statical electricity; dynamical electricity; magnetism; electro-magnetism; electrical measurements; thermo-electricity; applications of electricity.

Chemistry.—General chemistry.

Experimental lectures on physics and chemistry.

Heat.—Theories of heat; sources of heat; conduction, radiation, and convection; specific heat; effects of heat; instruments used for the measurement of heat; thermodynamics.

Physical measurements.†—In this course the Cadets are permitted to elect between work in the physical laboratory and work in the chemical laboratory.

The work in the physical laboratory during the year 1880 consisted in the calibration of two thermometers, and in the preparation of tables for the correction of the readings of these and several others; determination of the ratio of the arms of a chemical balance; determination of coefficient of torsion; determination of specific gravities; determination of the specific heat of various specimens of boiler scale, and an investigation of the thermal conductivity of boiler scale; measurement of the focal length of lenses, and the index of refraction of glass and of water containing different quantities of Na Cl in solution; photometric observations; experiments with the spectroscope, saccharimeter, and diffraction bank; measurements of the resistance of batteries of various forms and working under different conditions; comparison of the resistances of the various sets of resistance coils in the laboratory; determination and comparison of the constants of three tangent galvanometers; an investigation of the changes in electrical resistance of carbon due to changes in pressure.

The work in the chemical laboratory during the year 1879–80 embraced blowpipe analysis; crystallography; mineralogy; quantitative analysis.

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* Cadet-Midshipmen only. † Cadet-Engineers only.

The course in mineralogy comprised the study in the mineral cabinet of the most commonly-recurring minerals, the useful ores, and the objectionable minerals which are frequently associated with them.

The course in quantitative analysis consisted of the gravimetric determination of—

Iron in ammonio-ferrous sulphate.

Copper and tin in gun-metal.

Copper, antimony, and zinc in "white brass."

Tin and lead in solder.

Lead, carbon dioxide, and insoluble residue in a white lead ground in oil.

Valuation of a coal.

The preparation and standardizing of a solution of potassic permanganate by means of iron wire, ammonio-ferrous sulphate, oxalic acid, and ammonic oxalate.

The estimation of iron in an iron salt, and in hematite and magnetite ores by means of the permanganate solution.

Preparation and standardizing of a solution of potassic dichromate.

Estimation of iron in an iron salt by Penny's method.

Text-books.—Stewart's Elementary Physics; Eliot and Storer's Chemical Analysis; Jenkins's Magnetism and Electricity; Stewart's Elementary Treatise on Heat; Miller's Inorganic Chemistry; Kohlrausch's Physical Measurements; Nason and Chandler's Blowpipe Analysis; Dana's Manual of Mineralogy; Thorpe's Quantitative Chemical Analysis.

Cadet-Engineers of the first class have additional practical exercises in chemical analysis every Saturday morning, while the Cadet-Midshipmen exercise in seamanship.

DEPARTMENT OF MECHANICS AND APPLIED MATHEMATICS.

THE DIFFERENTIAL AND INTEGRAL CALCULUS.—The principles of the differential calculus, including Taylor's theorem, applications to problems of maxima and minima, and the tracing of curves; the methods of integration and the application of the integral calculus to areas, surfaces, and volumes. and to the finding of centres of gravity and moments of inertia, and to simple cases of differential equations.

MECHANICS.—*Statics*, including the theory of friction, adhesion, and stiffness of cordage. *Dynamics*, including the motion of projectiles in a non-resisting medium and in air; motions of translation and of rotation of bodies about an axis; falling bodies; central forces; the simple and the compound pendulum; the laws of planetary motion; work and conservation of energy.

HYDROSTATICS.—Mechanical properties of fluids; the laws of equilibrium and pressure; the flotation of bodies; the stability and oscillations of floating bodies; specific gravity; the motion of liquids. *Aëriform fluids.*—Laws of pressure; weight and pressure of the atmosphere; density and temperature; the barometer, the siphon, and the pump.

THE STRENGTH AND RESISTANCE OF MATERIALS.*—Simple and compound stresses; the relations between strain, stress, and resilience; the strength and stiffness of beams; beams of uniform resistance.

THE METHOD OF LEAST SQUARES.*—The theory of the method of least squares and the application of the method to results derived from experiments.

THEORETICAL NAVAL ARCHITECTURE.*

Text-books.—Rice and Johnson's Differential Calculus; Williamson's Integral Calculus; Todhunter's Mechanics for Beginners; Smith's Hydrostatics; Alexander's Applied Mechanics;* Rankine's Applied Mechanics;* Merriman's Method of Least Squares;* Wilson's Theoretical and Practical Ship-Building.*

ELECTIVE COURSES.

Cadets who have completed the elective course in mathematics are permitted to take an advanced course in the integral calculus and in analytical mechanics.

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* Cadet-Engineers only.

The course in theoretical naval architecture is elective for Cadet-Midshipmen. There is also an elective course in theoretical naval architecture for Cadet-Engineers.

Text-books.—Williamson's Integral Calculus, and Tait and Steele's Dynamics of a Particle; Thearle's Theoretical Naval Architecture; Lectures on the mathematical theory of naval architecture.

DEPARTMENT OF ENGLISH STUDIES, HISTORY, AND LAW.

LAW.—Constitution of the United States.—International law: rights and duties of nations in peace and war; rights of interference, of jurisdiction over the sea, of commerce, of passage over land and navigable rivers; duties of ministers, consuls, and naval commanders; kinds of property liable to capture; domicil; privateering; prizes; *jus postliminii;* rights and duties of neutrals; contraband; blockade; right of search; ship's papers; offenses against the law of nations.—Outlines of maritime law.

Text-books.—Woolsey's International Law; Andrews's Manual of the Constitution.

HISTORY.—Outlines of history, especially the history of Greece and Rome, and of the states of Western Europe down to 1880; historical geography; progress of colonial development in America; history of the United States; naval history; lectures.

Text-books.—Freeman's General Sketch of History, with Labberton's Historical Atlas; Eliot's History of the United States, with modern atlases.

RHETORIC AND COMPOSITION.—Essential properties of style; classification of sentences; rules for the construction of sentences; figures of rhetoric; exercises in the composition of themes and official reports.

Text-book.—Bain's Rhetoric.

ENGLISH.—Historical development of the English language; changes wrought by foreign influence on the grammar, vocabulary, and pronunciation. Etymology. Syntax; analysis of sentences.—Reading from standard authors. Classification of words; definition of words by usage and by derivation; synonyms; laws of change in the meaning of words.—Faults in diction, and their remedies; selection and arrangement; elementary principles of reasoning.

Text-books.—Tancock's English Grammar and Reading Book; Seeley and Abbott's English Lessons; Hart's Manual of Punctuation.

DEPARTMENT OF MODERN LANGUAGES.

FRENCH.—Grammar; exercises in reading, writing, and conversation.

SPANISH.—The course in Spanish is elective.

Text-books.—Keetel's French Grammar; La Fontaine's Fables; Prud'homme's French Nautical Phrases; Erckmann-Chatrian's *Le Conscrit* and *Waterloo;* Gasc's Dictionary; Roget's Spanish Manual; Tolon's Reader; Barretti's Dictionary.

DEPARTMENT OF DRAWING.

Free-hand drawing and practical perspective; topographical and chart drawing.

The foregoing studies are distributed over four years, and the Cadets are arranged in four classes, each class pursuing the course for the corresponding year.

PROGRAMME OF RECITATIONS.

The time devoted to daily recitations is divided into three periods, indicated thus: (1), (2), (3). (1) denotes first period, from 8.16 a. m. to 10.16 a. m.; (2) denotes second period, from 10.31 a. m. to 12.35 p. m.; and (3) denotes third period, from 2 p. m. to 4 p. m.

Practical exercises begin on Saturdays at 8 a. m. from October 1 to December 15, and from March 10 to June 1; and at 10.45 a. m. from December 15 to March 10. On other days, except Sundays, practical exercises begin at 4 p. m.

FIRST TERM.

From October 1, 1880, to January 29, 1881.

CADET-MIDSHIPMEN.

Departments.	Periods.	Subjects.
	FOURTH CLASS.	
Seamanship	M. (3)	Seamanship.
Mathematics	M. T. W. Th. F. (2) S. (1)	Algebra and geometry. Elective course once a week.
English Studies, History, and Law	M. T. W. Th. F. (1)	English and history.
Modern Languages	First division, T. Th. (3) Second division, W. F. (3)	Keetel's French grammar.
Drawing	First division, W. F. (3) Second division, T. Th. (3)	Free-hand drawing.
	THIRD CLASS.	
Seamanship	W. (3)	Seamanship.
Mathematics	M. T. W. Th. F. (1)	Trigonometry and descriptive geometry. Elective course once a week.
	F. (3)	Descriptive geometry.
English Studies, History, and Law	M. T. Th. (3)	English and history.
Modern Languages	M. W. F. (2)	French and elective course in Spanish.
Drawing	T. Th. (2) S. (1)	Topography.
	SECOND CLASS.	
Seamanship	Th. (3)	Luce's Seamanship.
Ordnance and Gunnery	F. (3)	Infantry tactics and Ordnance Instructions.
Astronomy, Navigation, and Surveying	M. (2) T. (3) S. (1)	Astronomy.
Mechanics and Applied Mathematics	M. W. Th. F. (1) T. (2)	Calculus. Elective course twice a week.
English Studies, History, and Law	W. (2)	English and history.
Modern Languages	M. (3) Th. (2)	French and elective course in Spanish.
Physics and Chemistry	F. (2) W. (3) T. (1)	Chemistry and heat.
	FIRST CLASS.	
Seamanship	T. (3) F. (1)	Ship-Building.
	M. W. (2)	Luce's Seamanship.
Ordnance and Gunnery	Th. S. (1) F. (2)	Ordnance and armor.
Steam-Engineering	W. Th. F. (3)	Marine engines.
Astronomy, Navigation, and Surveying	M. T. W. (1)	Navigation.
Physics and Chemistry	M. (3) T. Th. (2)	Electricity.

CADET-ENGINEERS.

Departments.	Periods.	Subjects.
	FOURTH CLASS.	
Mathematics	M. T. W. Th. F. (2) S. (1)	Algebra, geometry, and descriptive geometry. Elective course once a week.
Steam-Engineering	M. T. Th. (3)	Mechanical drawing and fabrication.
English Studies, History, and Law	M. T. W. Th. F. (1)	English and history.
Modern Languages	W. F. (3)	Keetel's French grammar.
	THIRD CLASS.	
Mathematics	M. T. W. Th. F. (1)	Trigonometry and descriptive geometry. Elective course once a week.
	W. (3)	Descriptive geometry.
Steam-Engineering	T. Th. (2) F. (3) S. (1)	Mechanical drawing and fabrication.
English Studies, History, and Law	M. T. Th. (3)	English and history.
Modern Languages	M. W. F. (2)	French and elective course in Spanish.
	SECOND CLASS.	
Steam-Engineering	M. (2) T. Th. F. (3)	Mechanical drawing, fabrication of machinery, and marine engines.
Mechanics and Applied Mathematics	M. W. Th. F. (1) T. (2)	Calculus. Elective course twice a week.
English Studies, History, and Law	W. (2)	English and history.
Modern Languages	M. (3) Th. (2)	French, and elective course in Spanish.
Physics and Chemistry	F. (2) T. S. (1) W. (3)	Chemistry and heat.
	FIRST CLASS.	
Seamanship	T. (3) F. (1)	Ship-Building.
Steam-Engineering	M. T. W. Th. S. (1) W. Th. F. (3)	Marine engines, fabrication, designing machinery, and mechanical drawing.
Physics and Chemistry	M. (3) Th. T. (2)	Electricity.
Mechanics and Applied Mathematics	M. W. F. (2)	Strength of materials.

SECOND TERM.

From January 31, 1881, *to June* 1, 1881.

CADET-MIDSHIPMEN.

Departments.	Periods.	Subjects.
	FOURTH CLASS.	
Seamanship	M. (3)	Seamanship.
Mathematics	M. T. W. Th. F. (2) S. (1)	Algebra and geometry. Elective course once a week.
English Studies, History, and Law	M. T. W. Th. F. (1)	English and history.
Modern Languages	First division, T. Th. (3) Second division, W. F. (3).	French.
Drawing	First division, W. F. (3) Second division, T. Th. (3).	Free-hand drawing and topography.
	THIRD CLASS.	
Seamanship	Th. (3)	Seamanship.
Mathematics	M. T. W. Th. F. (1)	Analytical geometry. Elective course once a week.
	T. (3)	Descriptive geometry.
Physics and Chemistry	T. Th. F. (2)	Elementary physics.
English Studies, History, and Law	M. W. (3) S. (1)	English and history.
Modern Languages	M. W. (2) F. (3)	French and elective course in Spanish.
	SECOND CLASS.	
Seamanship	W. F. (3)	Luce's Seamanship.
	Th. (2)	Naval tactics.
Ordnance and Gunnery	T. Th. (3)	Infantry tactics and Ordnance Instructions.
Astronomy, Navigation, and Surveying	F. (2) S. (1)	Astronomy.
Mechanics and Applied Mathematics	M. T. W. Th. F. (1)	Mechanics. Elective course twice a week.
English Studies, History, and Law	One period a month	English composition.
Modern Languages	M. (3) T. (2)	French and elective course in Spanish.
Physics and Chemistry	M. W. (2)	Heat.
	FIRST CLASS.	
Seamanship	M. W. (2)	Luce's Seamanship.
Ordnance and Gunnery	W. (3) F. S. (1)	Ordnance and armor.
Steam-Engineering	M. Th. (3) T. (2)	Marine engines.
Astronomy, Navigation, and Surveying	M. T. W. Th. (1)	Navigation and surveying.
Mechanics and Applied Mathematics	T. (2)	Elective course naval architecture.
English Studies, History, and Law	T. F. (3)	Public law.
Modern Languages	Th. F. (2)	French and elective course in Spanish.

CADET-ENGINEERS.

Departments.	Periods.	Subjects.
	FOURTH CLASS.	
Mathematics	M. T. W. Th. F. (2) S. (1) M. (3)	Algebra, geometry, and descriptive geometry. Elective course once a week. Descriptive geometry.
Steam-Engineering	W. F. (3)	Mechanical drawing and fabrication.
English Studies, History, and Law	M. T. W. Th. F. (1)	English and history.
Modern Languages	T. Th. (3)	French and elective course in Spanish.
	THIRD CLASS.	
Mathematics	M. T. W. Th. F. (1) Th. (3)	Analytical and descriptive geometry. Elective course once a week. Descriptive geometry.
Steam-Engineering	T. (3)	Mechanical drawing and fabrication.
Physics and Chemistry	T. Th. F. (2)	Elementary physics.
English Studies, History, and Law	M. W. (3) S. (1)	English and history.
Modern Languages	M. W. (2) F. (3)	French and elective course in Spanish.
	SECOND CLASS.	
Steam-Engineering	T. W. (3) Th. F. (2) S. (1)	Mechanical drawing, fabrication of machinery, and marine engines.
Physics and Chemistry	M. W. (2)	Heat.
Mechanics and Applied Mathematics	M. T. W. Th. F. (1)	Mechanics. Elective course twice a week.
English Studies, History, and Law	One period a month	English composition.
Modern Languages	M. (3) T. (2)	French and elective course in Spanish.
Navigation	Th. F. (3)	Descriptive astronomy.
	FIRST CLASS.	
Steam-Engineering	M. T. W. Th. F. (1) T. (2) Th. (3)	Marine engines, fabrication, designing machinery, and mechanical drawing.
Physics and Chemistry	M. W. (3)	Physical measurements.
Mechanics and Applied Mathematics	M. W. (2) S. (1)	The method of least squares. Naval architecture. Naval architecture, elective course.
English Studies, History, and Law	T. F. (3)	Public law.
Modern Languages	Th. F. (2)	French and elective course in Spanish.

EXAMINATION PAPERS—1879-80.

FOURTH CLASS.

DEPARTMENT OF MATHEMATICS.

ALGEBRA.

JANUARY, 1880.—*Time allowed, four hours.*

1. Simplify $(cx+by)^2+(cx+dy)^2+(ay-bx)^2+(cy-dx)^2$, expressing the result as the product of two factors. Given $r=(a^2-b^2-c^2+d^2)$, separate $4\,(ad-bc)^2-r^2$ into four factors.

2. Find the G. C. D. of $3x^4-10x^3+9x^2-2x$, and $2x^4-7x^3+2x^2+8x$; the L. C. M. of $3x^3-14x^2+16x$, and $x^3-7x^2+16x-12$; and reduce $\dfrac{x^5+5bx^4-b^2x^2-5b^3x}{x^4+3bx^3-b^2x-3b^3}$ to its lowest terms.

3. Simplify—

$$\frac{2}{x}-\frac{1}{a+x}+\frac{1}{a-x};\quad \frac{a+b-c}{a-b+c}+\frac{b-c-a}{a+b-c}-\frac{4(b-c)^2}{a^2-(b-c)^2};$$

and
$$\frac{a^2+a+1}{(a-b)\,(a-c)}+\frac{b^2+b+1}{(b-a)\,(a-c)}+\frac{c^2+c+1}{(c-a)\,(c-b)}.$$

4. Solve the equations $\dfrac{3x+7}{14}-\dfrac{2x-7}{21}+2\tfrac{3}{4}=\dfrac{x-4}{4}$;

$$\frac{6x-7\frac{1}{3}}{13-2x}+2x+\frac{1+16x}{24}=4\tfrac{5}{12}-\frac{12\frac{5}{8}-8x}{3}.$$

5. $(\surd x+28)(\surd x+6)=(\surd x+38)(\surd x+4)$; $(x+5)\,(y+7)=(x+1)\,(y-9)+112$; $2x+10=3y+1$; $\surd y-\surd(a-x)=\surd(y-x)$; $2\surd(y-x)=3\surd(a-x)$.

6. Find the square root of $3\frac{1}{2}-\surd 10$, and of $ax^2+by^2-2xy\surd(ab.)$ Find the fourth root of $17+12\surd 2$. Simplify $(x-1-\surd-2)\,(x-1+\surd-2)\,(x-2+\surd-3)\,(x-2-\surd-3)$ and $(a^2+a^{\frac{4}{3}}b^{\frac{2}{3}})^{\frac{1}{2}}+(b^2+b^{\frac{4}{3}}a^{\frac{2}{3}})^{\frac{1}{2}}$.

7. Solve the equations $\dfrac{x-1}{x+1}+\dfrac{x+3}{x-3}=\dfrac{2(x+2)}{x-2}$; $(x-c)\,\surd(ab)-(a-b)\,\surd(cx)=0$.

8. $\dfrac{x+\surd(x^2-y^2)}{x-\surd(x^2-y^2)}=4\tfrac{1}{4}-\dfrac{x-\surd(x^2-y^2)}{x+\surd(x^2-y^2)}$, $x(x+y)=52-\surd(x^2+xy+4)$.

Develop $(x^5-y)^{-\frac{3}{5}}$ to five terms by the binomial formula.

9. There are p Arithmetical Progressions, each beginning with 1, and the common differences are 1, 2, 3, &c., up to p; find the sum of the nth terms of the p progressions. If the pth term of a Geometrical Progression is P, and the qth term is Q, what is the nth term.

10. Given $y=2\,(a-x)\,(x+\surd x^2+b^2)$, find the greatest value that y can have for real values of x, and find the corresponding value of x.

Find x and y from the equations—

$$a(x+b)^3-b(x+a)^3=b(y+b)^3-a(y+a)^3,$$
$$x^2-2y(a+b)=y^2+a^2+b^2.$$

ALGEBRA.

JUNE, 1880.—*Time allowed, three hours.*

1. Solve the equations $\frac{x+2}{x-1} - \frac{4-x}{2x} = \frac{7}{3}$; $x^2 + \sqrt{(x^2+5)} = 11$,

and $$x + 2 - \frac{6}{x+2} = 1.$$

2. Find y in terms of x from the equation $y^2 - 6xy + 8x^2 - 8y + 27x + 11 = 0$. Find x and y from the equations $x^2 + y^2 = a^2$, $y = mx + a\sqrt{(m^2+1)}$.

3. Find x and y from the equations $y = mx - 2am - am^3$, $y^2 = 4ax$.

4. Develope $\sqrt{(1 - 3x - 4x^2)}$ to four terms by means of indeterminate coefficients. Find the sum of n terms of the series $(1)^2 + (2)^2 + (3)^2 + \ldots\ldots$

Separate $\frac{x^2 - 2x + 3}{(x-1)(x-2)(x-3)}$ into partial fractions.

5. Define the terms *logarithm, antilogarithm, base, modulus, arithmetical complement.* Find the values of the following expressions by means of logarithms $(373.56)^{\frac{1}{10}}$, $(.0028569)^{\frac{1}{5}}$, $(.36525)^{-\frac{1}{9}}$, $\frac{\log_{10} .0036545,}{\log_{10} .67264}$ $(.75862)^{.75862}$.

6. Find the value of the expression $\left\{ \frac{a^3bc^2d^{\frac{1}{2}} + 100}{e^3fg^5} \right\}^{\frac{1}{5}}$ given $a = 10795.$, $b = .00064521$, $c = .0087595$, $d = .000053812$, $e = 317880.$, $f = .0083542$, $g = .98985$.

7. Eliminate m between the two equations $y = \frac{2m}{1-m^2}(x-a)$, and $y + ma = \frac{m^2-1}{2m}x$, and show that $(x^2 + y^2 - 2ax)[(x-a)^2 + y^2] = 0$.

8. Find the value of x from the equations

$$y = mx + \frac{m(b^2 - a^2)}{\sqrt{(b^2m^2 + a^2)}}, \text{ and } a^2y^2 + b^2x^2 = a^2b^2.$$

GEOMETRY.

JUNE, 1880.—*Time allowed, three hours.*

1. Prove that the three perpendiculars from the vertices of a triangle upon the opposite sides meet in a point (P.). $A\,B\,C\,D$ is a parallelogram, E and F the middle points of $A\,D$ and $B\,C$ respectively; show that $B\,E$ and $D\,F$ will trisect the diagonal $A\,C$.

2. Inscribe a circle in a given triangle: Upon a line 1''.5 long construct a segment to contain an angle of 30°. (Give full proof of constructions.) Find the radius of a circle inscribed in a right triangle whose sides are a and b.

3. Prove that if from a point without a circle a tangent and a secant be drawn, the tangent is a mean proportional between the whole secant and its external segment. Prove that in any triangle the product of two sides is equal to the product of the segments of the third side formed by the bisector or the opposite angle together with the square of the bisector.

4. Divide a given line in *extreme and mean ratio*; find expressions for the segments, denoting the whole line by a. How may the square root of any number be *constructed?* In a right triangle $B\,A\,C$, the angle B is 30°, and the side $A\,C = a$: find the segments of the side $A\,C$ by the bisector of the angle B.

5. Prove that the volume of a triangular pyramid is equal to one-third the product of its base and altitude. *State* and *prove* the proposition which gives the volume of the frustum of a triangular pyramid.

6. Find the volume of a solid composed of a cylinder ($r = 5$, $h = 6$) surmounted by a frustum ($r_1 = 5$, $r_2 = 3$, $h = 4$), the whole capped by a segment of a sphere such that the centre of the sphere is at the centre of the upper base of the cylinder.

7. Given an isosceles triangle side a, base $2\,b$, find, by means of similar triangles,

the distance of P (see question 1), from the vertex. Let y denote the distance of P from one of the equal sides, and x its distance from a perpendicular to that side through the vertex.

(1) Find x and y in terms of a and b; (2) Show that $x(x^2+y^2)=a(x^2-y^2)$.

DESCRIPTIVE GEOMETRY.

CADET-ENGINEERS ONLY.

JUNE, 1880.—*Time allowed, three hours.*

Give full explanations of all constructions.

1. Show how to find the traces of a line. Find the point where a line pierces an oblique plane (two methods).

2. Find the intersection of two planes (1) when both traces intersect, (2) when the vertical traces meet and the horizontal traces are parallel, (3) when the traces meet on G, (4) when the traces are parallel to G, (5) when neither the horizontal nor the vertical traces intersect within the limits of the drawing.

3. Find the angle between two oblique planes. Through a given line pass a plane which shall make a given angle with a given oblique plane.

4. (1) Through a given point draw a line to make a given angle with the planes of projection. (2) Through a given point pass planes, making given angles with the planes of projection. When is (1) impossible? When is (2) impossible?

5. Given the three face-angles of a trihedral angle, $\alpha=60^\circ$, $\beta=30^\circ$, $\gamma=45^\circ$; find the three dihedral angles. Given two face-angles $\alpha=45^\circ$, $\beta=60^\circ$, and the dihedral angle between them 30°; find the other face and dihedral angles.

6. Pass a tangent plane at a given point on a cylinder of revolution, the axis being parallel to the ground line. Assume a cylinder oblique to H and V, circular base, radius $1''.25$, make a right section of it, and develop the portion of the surface between H and the cutting plane.

7. A frustum of a right circular cone rests with its larger base in H, the radius of this base is $2''$, and its centre C, is $2''.5$ from the ground line. The elements of the frustum are $2''$ in length and make an angle of 45° with H. In the interior of the frustum is placed an inverted cone, the vertex being at C, and its base coinciding with the upper base of the frustum. Denote an element of the frustum parallel to V by $A\,B$, A being in the *lower* base and B in the upper base. It is required (1) to construct the projections of the two surfaces; (2) to construct the projections of a section of the two surfaces by a plane perpendicular to $A\,B$ at B; (3) to draw tangents to the section of the inverted cone through the point where the vertical through A meets the cutting plane; (4) to find the points where these tangents pierce the frustum.

CURVE TRACING (ELECTIVE).

JUNE, 1880.—*Time allowed, four hours.*

Cadet-Engineers C. E. Woodruff, J. M. Ellicott, C. P. Eaton, W. J. Baxter, and S. W. Armistead. Cadet-Midshipmen S. D. Greene, C. E. Sweeting, G. W. Street, E. E. Keifer, J. B. Jackson, T. H. Gignilliatt, and W. E. Bowman.

1. Trace the locus of the equation $4y^2-4xy+2x^2-16y-2x+25=0$. Find the equations to tangents parallel to the axis of Y, and find what the equation becomes when the origin is moved to the centre.

2. Trace the locus of $(x-2y-4)^2=6-x$; find the equations to the tangents at the points where the curve crosses the axis of X.

3. Sketch the loci of the equations $x^2+y^2-6x+8y=0$, $xy+4x-6y=0$,
$x^2-2xy+2x+4y-3=0$, $y=x^3$, $x^2=-y^3$, and $x^3+y^4=0$.

4. Given $(x-y)(x^2-4y^2)=2ax^2+10axy+20ay^2+24a^2x$, find the equations to the asymptotes, and to the line which passes through their intersection with the given locus; trace the curve.

5. Trace the locus of $(x-2a)(x-a)y^2=a^2x^2$, and of $(xy-12a^2)^2=36a^3(3a-y)$. In the latter, determine the maximum ordinates and abscissas.

6. Trace the curves $x^4-a^2xy-ay^3=0$, and $x^4+ax^2y-ay^3x=0$; in the latter, find the equation to a tangent parallel to the axis of X.

7. Trace the curve $2x(x-y)^2-3a(x^2-y^2)+4a^2y=0$.

8. Find the asymptotes to $x^6-x^4y^2-2a^2xy^3-a^4x^2+3a^5y=0$, and the points where they meet the curve; trace the curve.

DEPARTMENT OF ENGLISH STUDIES, HISTORY, AND LAW.

PUNCTUATION.

October, 1879.—*Time allowed, two hours.*

1 punctuate and put in capitals in the examination paper

2 write out the following forms

1 an indorsement on a report of a survey of the entrance of chesapeake bay 2 date of a report from the trenton lying in the harbor of toulon 3 abbreviations of designations of rank

3 give rules for the use of six separate points in the following extract what is the soul was a question once put to marivaux I know nothing of it he answered but that it is spiritual and immortal well said his friend let us ask fontenelle he will tell us what it is heavens no cried marivaux ask anybody but fontenelle

4 state the rule for the use of points in connection with marks of parenthesis in the following cases (1) when in the absence of a parenthesis no point would be needed (2) when in the absence of a parenthesis a comma would be needed (3) when the parenthesis has a point of its own

5 give the rules for the punctuation of the following extract what hope can there be for the colonies of nations that possess no spring of improvement and tolerate none in the nation's over which they rule whose administration sets no bright example of parliamentary independence whose languages send out no lessons of science literature and philosophy but repeat with every ship that crosses the atlantic the same message of a debasing bigoted and antiquated superstition

ENGLISH.

MONTHLY EXAMINATION.

November, 1880.—*Time allowed, two hours.*

I. Explain the difference between dialects and languages; between the synthetic and analytic conditions in a language.

II. "Close likeness to Scandinavian dialects is to be found in northern English, close likeness to Frisian dialects in southern English." Explain fully.

III. Show why inflections are lost in the development of a language; and give a list of the inflections lost by the introduction of Norman French.

IV. Show how the Celtic language influenced English.

V. "In early times, English literature was local." Explain this, show why it was so, and how a change came about.

VI. Show how the conquest of the Saxons, Angles, and Jutes differed from the Norman conquest, in the treatment of the conquered race.

VII. Explain the meaning of the following terms: 1. Saxon. 2. England. 3. Britain. 4. Briton. 5. Welsh. 6. Revival of Letters.

ENGLISH AND HISTORY.

JANUARY, 1880.—*Time allowed, four hours.*

[Starred (*) questions are alternatives.]

A.—HISTORY.

1. "The Roman Empire of the West had become a German state." Show when, by whom, and through what combination of circumstances, this change was accomplished, and on what grounds it was justified.

1.* Explain the change that took place in the character of the national assembly in Germany, in the middle ages, and trace the causes that gave it its later character. Name the persons with whom rested the selection of the Emperor after the eleventh century. How did this method of selection differ from the original way of choosing a King among the Teutonic nations?

2. League of Cambray and Holy League: dates, parties, objects, and results.

2.* What country was the battle-field of Europe from 1515 to 1530? What were the opposing parties in these wars? What advantages had each party at the outset? Give the date and place of the most important battle of the period, and state its immediate results. What were the general results of the whole struggle?

3. What was the first Aryan nation that occupied Western Europe? What traces exist of inhabitants anterior to the coming of this nation? What became of this first Aryan nation? What and where are its present representatives? What Turanian nations still inhabit Europe?

4. Describe the position of Sparta and Athens, with reference to the rest of Greece, between 305 and 371. Name the battles that took place at these dates, the parties and victorious leader in each, and fix the position of the battle-fields.

Who was Themistocles? Agis? Philopoimen?

5. State the exact position of, and some point of historical importance connected with, the following, giving dates: 1. Chalons. 2. Nikaia. 3. Crecy. 4. Avignon. 5. Trent. 6. Nancy. 7. Sempach. 8. Trebizond. 9. Habsburg. 10. Lepanto.

B.—ENGLISH.

6. "The history of the language during these centuries would be the story of the way in which the speech of the home-dwellers swallowed up that of the new-comers." Explain fully this passage; name the dialects introduced by the "new-comers"; give the principal points in reference to the contest between the two languages, and the dates that fix its beginning and end.

7. Analyze: "In the gardens you will see a solitary laborer, working with that apathy that characterizes an Irishman when he labors for himself."

8. Analyze: "These waves are to me what the land is to you, for I was born on them, and I have always meant that they should be my grave."

ENGLISH.

MAY, 1880.—*Time allowed, five hours.*

[Starred questions are alternatives.]

1. Name and define the laws of linguistic change, giving an illustration of each, and showing from the etymology of the word how the law applies.

1.* How does a novel differ from a romance? In what two ways may the incidents of a work of fiction illustrate character? Apply this distinction to any two works you have read.

2. Explain expressed and implied metaphor, and show that the latter is the basis of a large part of language.

2.* Give the admissible and inadmissible contractions of *am, are, were, have, has, do, shall,* with pronouns and with the negative *not.*

3. What is induction? What is induction through enumeration? Why is experiment necessary to induction?

3.* Distinguish between essentials and accidents. What is mathematical certainty? Explain *ignoratio elenchi,* and show how to meet it.

4. Explain *epic, idyl, plot, fine writing, syllogism.*

5. Into what errors is a writer most likely to fall in dealing with incidents and characters, in historical composition?

5.* In what kind of composition does argument principally occur, and how should the form of composition modify the handling of the argument?

6. Under what limitations may speech be said to be the guide to written prose?

6.* Name some of the sources of prejudice, and show how it interferes with correct observation and correct inference.

7. Correct and point out the faults in the following:

"He was the universal favorite of all who knew him, and cemented many friendships at this period (moving in the highest circles of society, and, as he had certain property, being independent of the profits of literature), and soon completely extinguished the breath of slander, which, at the inauguration of his career, had threatened to sap the foundations of his reputation."

8. Correct and point out the faults:

"As soon as the man in the plug hat had ventilated his opinions, a panic took a hold of most every person on change. I reckon the market had busted, and some individuals must have lost considerable. I lay down my hat, and just set still and watched. I was sort of curious to know what would transpire."

9. It is stated to you, in conversation, that naval officers fifty years ago wrote books at the age of 30, and that they do not write books now at that age; and from this the speaker infers that the Academy course is defective. On inquiry, you find that he can cite only one case in support of his statement. Point out the errors in the argument, and show in general the danger of this form of reasoning.

"Old friends are best. King James used to call for his old shoes; they were easiest for his feet." Classify and discuss the argument.

10. "As to woman's wages I hold them inferior partly because of her inferior strength, but mainly because of her inferior skill. Nilsson has no cause to complain; and the whortleberries sold in our markets bring no higher price when picked and offered by men, than when offered by women."

Point out the inductive and the deductive parts of this argument. Put the deduction in the form of a syllogism, supply the missing premise, and point out the major and minor premises and the middle term.

N. B.—The proposition, "woman's wages are inferior," is to be taken as the *conclusion* in the syllogism.

HISTORY OF THE UNITED STATES.

JUNE, 1880.—*Time allowed, four hours.*

1. Give an account of the Alabama claims, the negotiations connected therewith, and the final settlement.

2. What territory was acquired from Mexico in 1848? Give an account of the measures taken towards its reorganization.

3. Give a brief statement of the financial measures adopted at the beginning of Washington's administration, (1) to provide a revenue, (2) to secure the public credit.

4. Connect the Missouri Compromise with the Kansas-Nebraska act, showing from the provisions of the two acts what they had to do with each other.

5. Explain the terms *patroon, articles of confederation, charter government, representative assembly.*

6. Give a brief account of any three of the following. 1. Nathaniel Bacon. 2. Roger Williams. 3. Daniel Webster. 4. D. G. Farragut.

7. When and how did the Federalists lose control of the government? State the circumstances connected with this event, and the political doctrines advocated by the different parties.

8. Name the thirteen acts of Parliament that led directly to the revolution, and describe any two of them.

9. Give a brief account of any three of the following. 1. Dred Scott case. 2. Embargo of 1807. 3. Ostend manifesto. 4. Louisiana purchase.

10. "American political history is a history of compromises." Show that this is true, and describe fully the compromise of 1832.

DEPARTMENT OF MODERN LANGUAGES.

FRENCH.

JUNE, 1880.—*Time allowed, three hours.*

Translate into French:

1. Good evening, Miss A——. I hope I do not disturb you?
2. No, sir; on the contrary, I am very glad to see you.
3. When did you receive a letter from your brother?
4. I received one last evening.
5. How old is he now?
6. He will be fifteen next May.
7. Will he come home next summer?
8. No, sir; generally the midshipmen make a cruise during the summer.
9. Do they take sailors to help the midshipmen?
10. Yes, sir; because without them they could not work ship.
11. What ports will they visit?
12. They will only go to France this year.
13. Do the midshipmen learn French at the Naval Academy?
14. They are obliged to learn it, because with English and French the naval officer can travel everywhere.
15. How long does it take to go to France?
16. I am told that with a good wind it only takes twenty-five days.
17. In that case your brother will come back to the United States about the first of September.
18. Yes, sir; and then the Admiral will grant the midshipmen a month's leave to visit their homes.
19. I suppose you will be much pleased to see him?
20. We shall be very glad, for it is now a year since he left us.
21. I will do myself the pleasure to call when he returns.

Translate into English:

I. Un officier français étant arrivé à la cour de Vienne, l'impératrice Thérèse lui demanda, s'il croyait que la princesse de N * * *, qu'il avait vue la veille, était réellement la plus belle femme du monde, comme on le disait. "Madame," répliqua l'officier, "je le croyais hier."

II. Henri IV rencontrant un jour dans son palais un homme qui lui était inconnu, lui demanda à qui il appartenait: "Je m'appartiens à moi-meme," répliqua l'inconnu. "Mon ami," dit le roi, "vous avez un sot maître."

GRAMMAR.

1. How many genders are there in French?
2. How is the gender of nouns denoting living things determined?
3. Give the French articles.
4. When is the euphonic *t* used in French?
5. As a general rule how is the plural formed?
6. Give the possessive adjectives with their masculine, feminine, and plural forms.
7. With what do the possessive adjectives agree?
8. What is the ending of the infinitive of verbs of the first conjugation? Name some of them.
9. When is a noun said to be used in a general sense?
10. What is the English of *vouloir*, *pouvoir*, and *savoir?* To what conjugations do they belong?
11. How many kinds of personal pronouns are there?
12. What is the meaning of *chez?* Give an example.
13. What relation does *en* express? Give an example.
14. When is a noun said to be used in a partitive sense? Give an example.
15. By what preposition is the infinitive limiting an abstract noun preceded?
16. Are *cent* and *mille* preceded by the numeral "*un*"?
17. When are *dans* and *en* to be used? Give an example.
18. What is the French of "*To be*," used impersonally?
19. Give in a table—
    (*a*) The present indicative, first person singular and plural.
    (*b*) The third person singular and plural of the imperfect.
    (*c*) The second person singular and plural of the future.
    (*d*) The first and second persons singular and plural of the present subjunctive of *avoir*, *être*, *parler*, *finir*, *aller*, *venir*, and *sortir*.

THIRD CLASS.

DEPARTMENT OF MATHEMATICS.

TRIGONOMETRY.

JANUARY, 1880.—*Time allowed, four and a half hours.*

Without tables.

1. Define the *sine* of an angle, the *tangent* and the *versed sine;* what is meant by the circular measure of an angle? What is a *small* angle? How do you find the sine or tangent of a small angle? How do you take from the tables the functions of $\frac{n\pi}{2} \pm y$?

2. Deduce the formulas for the sine and cosine of $(x \pm y)$ (full demonstration): find the functions of 30° and 45°, and apply the preceding formulas to find the sine, cosine, and tangent of 15°.

3. Deduce formulas for the sine, cosine, and tangent of $\frac{x}{2}$; find the sine, cosine, and tangent of $7° \, 30'$ from those of 15°. Show how to solve a right triangle when the hypothenuse and one side are given, and are very nearly equal.

4. Deduce the formulas $\sin x + \sin y = \ldots\ldots$ and $\cos 2x = 1 - 2\sin^2 x$, and apply them to solve the equation, $\sin 9x + \sin 5x + 2\sin^2 x = 1$; express the result, so as to include *all* angles which satisfy the equation.

5. Prove that in any plane triangle $\frac{\sin A}{\sin B} = \frac{a}{b}$, and $a^2 = b^2 + c^2 - 2bc \cos A$: express each of these results in the form of a theorem. Deduce $\sin^2 \tfrac{1}{2}A = \ldots$ and $\cos^2 \tfrac{1}{2}A = \ldots$.

6. In a plane triangle given a, 10; b, 30; C, 60°: find c and $\tan A$; the area of the triangle, and the radii of the inscribed and circumscribed circles.

7. Prove that in a spherical triangle $\cos a = \cos b \cos c + \sin b \sin c \cos A$ (state the theorem), and thence deduce the theorem, that the sines of the sides are proportional to the sines of the opposite angles.

8. Write the formulas for the solution of a spherical triangle when A, B, and c are given and arrange a *form* for the computation.

Solve a right triangle, given $A = \tan^{-1} \frac{5}{12}$, $c = \sin^{-1} \frac{4}{5}$.

9. A pole when vertical casts a shadow a feet in length, but when inclined at an angle of 30° to the horizontal, the length of the shadow is $(a + b)$ feet; find the length of the pole.

10. A pyramid stands on a horizontal plane, the base is an equilateral triangle, and the altitude of the pyramid is $\frac{2}{3}$ of the altitude of the triangle; one edge of the base is in a N. and S. line. The altitude of the sun being a, and its azimuth 60°, it is required to find an expression for the tangent of the vertical angle of the triangular shadow of the pyramid. What must be the angle a, (1) so that the required angle may be 90°? (2) so that it may be 60°?

JANUARY, 1880.—*Time allowed, four and a half hours.*

Practical work.

[One question may be omitted.]

1. In a plane triangle, given a, 319.49; b, 571.82; C 37° 30′ 30″, find the other parts.

2. Given a, 84.762; b, 102.47; A, 54° 45′ 30″: solve the triangle.

3. Given a, 319.49; b, 571.82; c, 624.41: find the angles, the area, and the radii of the inscribed and circumscribed circles.

4. Given $c = 80.34$, the perpendicular p upon c, 4.631, and $a - b$, 79.82; solve the triangle (See Chauvenet, Art. 164, page 83).

5. To determine the distance between two inaccessible objects C and D, a base line of 1,713 yards was measured in the same horizontal plane, and the following angles were observed: BAD, 40° 16′; BAC, 97° 56′; ABC, 42° 22′; and ABD, 113° 29′: Find CD (before beginning the work, draw a figure and state what triangles are to be solved, noting the given and the required parts in each).

6. In a spherical triangle, given A, 135° 30′; b, 97° 8′; c, 113° 20′: solve the triangle.

7. Given h, 29° 45′ 30″; d, 18° 30′ N.; L, 45° 32′ 30″ N.: find t and Z.

8. Given h, 44° 57′; d, 22° 29′ S.; t, 30° 11′: find L and Z.

9. Given h, 45°; d, 22° 30′ S.; t, 30°. Make a stereographic projection of the astronomical triangle on the plane of the equator, radius of primitive circle 2″. Find the actual length in inches of that portion of the projection of a small circle which is included within the primitive; the small circle being drawn from M as a pole, with a polar distance equal to $90° - h$.

DESCRIPTIVE GEOMETRY.

CADET-MIDSHIPMAN.

JUNE, 1880.—*Time allowed, three hours.*

[One question may be omitted.]

1. Construct the projections of a hexagonal prism oblique to H and V; make a right section of the prism and find the true form of the section.

2. Assume two planes, both oblique to H and V, and find the angle between them (full explanation). Assume a plane oblique to H and V and an oblique line not in the plane; find the point where the line pierces the plane by two methods: explain both.

3. Cut a parabola from a right cone and develop the cone and curve. Draw a tangent to the curve, and to its development.

4. Cut a right cylinder by an oblique plane and develop the cylinder and curve. What is the curve? Find its equation, denoting the radius of the cylinder by a, and the inclination of the plane by α.

5. Make a section of a surface of revolution (either an ellipsoid or a hyperboloid) y a plane oblique to H and V and draw a tangent to the curve.

6. A sphere, radius 1″, has its centre 1″.5 in front of V and 1″.5 above H; a line erpendicular to V passes through a point 1″.5 to the left of the centre of the sphere. A surface is generated by a straight line which is parallel to V, and constantly touches the sphere and line given above. Construct the projections of the surface, showing the curve of contact with the sphere. Find a section of the surface by a plane parallel to H and 1″.5 above the centre of the sphere. Find the equation to the surface, and the equation to the horizontal projection of the section, taking the origin at the centre of the sphere.

DESCRIPTIVE GEOMETRY.

CADET-ENGINEERS ONLY.

JUNE, 1880.—*Time allowed, four hours.*

[One question may be omitted.]

1. Make a right section of a cylinder which stands obliquely to H and V, and has a circular base in H. Find the true form of the section.

2. Cut a hyperbola from a right cone and construct the asymptotes.

3. Pass a plane tangent to a sphere through a given line, the center of the sphere being above H and in front of V, and the line oblique to H and V.

4. Construct the projections of a helix with a vertical axis; prove that the shadow upon H is a cycloid. Construct a tangent to the helix at a given point. Construct a tangent to the cycloid at a given point.

5. Find by means of an auxiliary circle the horizontal trace of a plane tangent to a helicoid at a given point: make use of this method to find the line of shade on a helicoid: give complete explanations and proof.

6. Make a section of a surface of revolution (either ellipsoid, hyperboloid, paraboloid or ring) by a plane oblique to H and V. Explain the method, and draw a tangent to the curve.

7. An inverted frustum of a cone stands on H, radius of lower base 0″.75, radius of upper base 1″.5, height 2″, axis 3″ in front of V. Find the shade on the surface, and the shadow on the interior and on H; the horizontal and vertical projections of the rays making angles of 30° and 135° with the ground line respectively.

8. A paraboloid of revolution stands on H, axis vertical and vertex down. Find the line of shade, the shadow on H, and the shadow on the interior surface; rays parallel to V, and inclined to H (30° to 45°).

ANALYTICAL GEOMETRY.

JUNE, 1880.—*Time allowed, three hours.*

[One question may be omitted.]

1. A line $A\ B$ cuts intercepts a and b from rectangular coordinate axes; find the equations to the sides of the square described on the line. Find the co-ordinates of the centre of the square. What is the *locus* of the centre?

2. Deduce the formulas by which rectangular axes are turned through an angle ϕ. Find the co-ordinates of the centre of the conic, $x^2-2xy+4y^2+8ax+26ay+27a^2=0$, and move the origin to that point. What does the equation $(x-y+3a)^2=4ax\sqrt{2}+6a^2$

become when the axes are turned 45°? What is represented by the equation $r=c\left\{\sin\theta+\cos\theta\pm\sqrt{\sin 2\theta}\right\}$

3. Find the equations to the tangent and normal to the parabola in terms of m. Find the locus of the intersection of perpendicular tangents. Find the locus of the intersection of perpendicular normals.

4. Show that in the ellipse the normal bisects the angle between the focal distances; and that a perpendicular upon the tangent from a focus, meets the tangent upon the circumscribed circle. Find the relation between the direction ratios of conjugate diameters, and show that the eccentric angles of the vertices of two conjugate diameters differ by $\frac{\pi}{2}$.

5. Trace the loci of the equations,

$$4y^2-4xy+3x^2+20x-16y-16=0, \text{ and } (2x-y)(2y-x)=4x+4y-6.$$

6. Find the co-ordinates of the points where the parabola, $y^2=4ax$ is met by its normal, $y=mx-2am-am^3$. Show that the locus of the intersection of the normal with the perpendicular upon it from $(9a, 6a)$, taking the origin at that point, is $y^2(x^2+y^2)=a(x+y)(x+2y)(x-3y)$. Trace the curve.

7. Through the point A (a, o) draw a line meeting the axis of Y at B, and a second line meeting it at C, so that $OAC=2\ OAB$. It is required to find the locus of the intersection of $A\ C$ with the perpendicular upon it from B.

INTEGRAL CALCULUS.

ELECTIVE COURSE.

JUNE, 1880.—*Time allowed, four hours.*

Cadet-Midshipmen L. Nixon, J. T. Arnold, E. W. Sutphen, and S. S. Wood.
Cadet-Engineers R. W. Gatewood, Emil Theiss, W. H. P. Creighton, and J. H. Fitts.

Integrate the following expressions:

1. $\cos^2\theta d\theta$, $\dfrac{dx}{a+2bx+cx^2}$ (two cases).

2. $\dfrac{dx}{\sqrt{(x^2+a^2)}}$, $\dfrac{dx}{\sqrt{(x-a)\ (x-\beta)}}$, $\dfrac{dx}{\sqrt{(x-a)\ (\beta-x)}}$.

3. $\dfrac{dx}{(a+cx^2)^{\frac{3}{2}}}$, $\dfrac{d\theta}{\sin\theta}$.

4. $\dfrac{d\theta}{a+b\cos\theta}$ (two cases).

5. $\sqrt{(a^2-b^2)}dx$, $\sqrt{(2ax-x^2)}dx$, $\dfrac{dx}{x\sqrt{(2ax-x^2)}}$.

6. $\dfrac{x^2dx}{x^4+x^2-2}$.

7. $\dfrac{(1+x^2)dx}{(1-x^2)\sqrt{(1+x^2+x^4)}}$.

8. Find the whole area of the curves,

$$r=a\ (1-\cos\theta), \text{ and } a^2y^4=x^4\ (a^2-x^2).$$

9. Find the area of the curve,

$$4y^2-4xy+5x^2-16y-32x+52=0.$$

10. Deduce by integration a formula for the volume of the frustum of a cone in terms of its altitude and the radii of its bases. Find the volume generated by a circle which revolves about a tangent.

11. Find the volume of an ellipsoid, semi-axes a, b, and c; and the volume of an elliptic paraboloid, semi-axes of base a and b, and height c.

12. Trace the curve $x^5+y^5=5ax^2y^2$; find the area of the loop, and the area between the infinite branches and the asymptotes.

13. Trace the curve $y^3+x^2y-axy+bx^2=0$, and find the area of the loop.

14. A straight line of constant length, $a\sqrt{2}$, moves with its extremities in contact ith two fixed lines which are perpendicular to each other, but not in the same plane; he perpendicular distance between the two fixed lines is a. Find the equation to he surface generated by the moving line, and find the volume included within the urface.

DEPARTMENT OF PHYSICS AND CHEMISTRY.

ELEMENTARY PHYSICS.

JUNE, 1880.—*Time allowed, four hours.*

[Ten questions required.]

1. Define concisely the terms—mass, weight, density, force, work, dimensional equa-ion, centre of gravity, moment of a force with respect to a point, wave and wave ront.

2. Also temperature, coefficient of expansion, specific heat, latent heat, index of efraction, critical angle, principal focus, virtual focus, and conjugate foci.

3. The numerical value of a certain force is 56 when the units of mass, length, and ime are a pound, a foot, and a second. What is the numerical value of the same orce when the units are a kilogramme, a meter and second?

4. A man rowing at the rate of eight miles per hour wishes to cross, directly, a iver which takes him down stream at the rate of 4 miles per hour. What course must he steer?

5. One side of a U tube 3^{cm} in diameter contains 8 kilogrammes of mercury at 0° C. How much alcohol at same temperature in the other side, which is 2^{cm} in diameter, will counterpoise the mercury? What is the relation between the heights of the columns of mercury and alcohol? Sp. gr. of mercury 13.59; coefficient of expansion of mercury .00018; sp. gr. of alcohol .91; coefficient of expansion of alcohol 0012.

6. The report of a gun is heard 15 seconds after the flash is seen. Required, the distance of the gun, the temp. of the air being 22° C., and the velocity of sound in air at 0° C. 333^{m} per sec. What is the velocity of sound in a gas that gives with a losed pipe the octave of the note of an open pipe sounded with air?

7. What will be the volume at 60° C and 820^{mm} of a flexible balloon containing 25 iters of air at 12° C. and 740^{mm}?

8. The bathing tank is about 10^{m} long, 5^{m} wide, and 1.75^{m} deep. How much steam must be passed through the pipes to raise the temperature of the water from 4° C. to 0° C., provided steam enters at 100° C. and is discharged as water of temperature 8° C., and provided the weight of the tank is 2,500 kilos. and its specific heat .22?

9. Prove that a body of clear water is $\frac{1}{4}$ deeper than it appears looking directly down. An eye under water and directed towards the smooth surface sees all outside objects down to the horizon, and at the same time all objects on the bottom. Account for this and the size of the aperture through which all external objects are seen. ndex of refraction of water 1.33+.

10. What is the size and position of the image of a flame 2^{cm} high placed 14^{cm} rom a concave mirror of 12^{cm} radius?

11. What is the angle of minimum deviation caused by a glass prism whose refracting angle is 60° and index of refraction 1.5?

12. Describe the astatic galvanometer used in the lecture room. If a current flow n the direction of the arrows in the diagram, which end of the astatic system will tend o move up?

DEPARTMENT OF ENGLISH STUDIES, HISTORY, AND LAW.

EUROPEAN HISTORY.

MONTHLY EXAMINATION.

OCTOBER, 1879.—*Time allowed, two hours.*

1. "There was a continuous succession between the early and later emperors without any break." Show this, tracing the important steps in the succession between Augustus and Charles V.
2. Explain the importance of the feudal system in its effects on government and society in the middle ages.
3. Give an account of the Latin Empire of Constantinople and of the crusade with which it began.
4. Give some account of Popes Julius II, Leo X, Alexander VI, Sixtus V.
5. Give an account of the confession of Augsburg; the battle of Lepanto; the revolt of the Netherlands.
6. Draw a map of central and western Europe, as settled by the Peace of Westphalia, putting down the boundaries of the principal states, and the following:

1. Avignon.
2. Strassburg.
3. Bremen.
4. Rhone R.
5. Roussillon.
6. Dunkirk.
7. Metz.
8. Augsburg.
9. Orange.
10. Lübeck.
11. Loire R.
12. Lützen.
13. Paris.
14. Milan.
15. Elbe R.
16. Pyrenees Mts.
17. Geneva.
18. Cambray.
19. Zürich.
20. Lucca.

EUROPEAN HISTORY.

MONTHLY EXAMINATION.

NOVEMBER, 1879.—*Time allowed, two hours.*

1. Italy, 1859–1861.
2. Explain the causes and results of the war of the Austrian Succession, stating the sides, states engaged, and leaders.
3. Give some account of—1, Thiers; 2, Bernadotte; 3, Duke of Wellington; 4, Kossuth; 5, Isabella of Spain.
4. Show how the abdication of Francis II, in 1806, put an end to the Holy Roman Empire.
5. Give an account of the circumstances that led to the French revolution.
6. Draw a map of central and western Europe at the height of Napoleon's power, putting down—

Amiens,
Trafalgar,
Leipzig,
Elba,
Austerlitz,
Pressburg,
Jena,
Wagram,
Copenhagen,
Malta,
Frankfurt,
Venice,
Warsaw,
Mainz,
Bern;

and the boundaries of France, Spain, Rhine Confederation, Bavaria, Saxony, Prussia, Grand Duchy of Warsaw, Westphalia.

CONSTITUTION OF THE UNITED STATES.

MONTHLY EXAMINATION.

DECEMBER, 1879.—*Time allowed, two hours.*

1. Explain bill of attainder, letter of marque, bill of credit, law impairing the obligation of contracts, legal tender, bonds and stocks.
2. Explain the methods of voting in Congress, and give the provisions of the Con-

itution in regard to recording votes. State briefly the three ways in which a bill ay become a law.

3. Who presides in the court of impeachment when the President is tried? Why? hat can you say about the disability of the President from discharging his duties such a case? What is the lightest punishment that a court of impeachment can flict? The heaviest?

4. Acts have been passed "which are indefensible on the theory of specially enumeated powers, and which can only be sustained on the general doctrine of national vereignty." Explain fully the theories referred to, giving examples of such acts, nd state and explain the constitutional clause referring to the general powers of ongress.

5. Describe the system of national banks, stating the limitations as to circulating otes. Point out its advantages over the old system. How were the State banks ompelled to withdraw their circulation? What change was made in the coinage in 853? Explain excise.

CONSTITUTION OF THE UNITED STATES.

MONTHLY EXAMINATION.

JANUARY, 1880.—*Time allowed, two hours.*

1. State the powers of the President granted by the terms of the Constitution.

2. Explain law and equity, original and appellate jurisdiction, writ of mandamus, ndictment.

3. In what does treason consist according to the Constitution? What is necessary o a conviction of this crime? What is provided in the Constitution in regard to the unishment of treason? What is constructive treason?

4. What are the provisions of the Constitution and of the statutes in regard to the urrender of fugitives from justice?

5. State the provisions of the Constitution in regard to the admission of new States; n regard to the government of the Territories. State the cases in which foreign territory has been acquired, and discuss the constitutional power of the government to make such acquisitions.

RHETORIC.

MONTHLY EXAMINATION.

MARCH, 1880.—*Time allowed, two hours.*

[Omit any one you please of the seven questions; the answers to only six of the questions required.]

I. Name and explain the four facts or processes that form the constituent elements of science.

II. Explain the importance and bearing of (1) chronology, (2) geography, in the study of history.

III. Explain the terms "subject world" and "object world," genus and specific difference, rule of parallel construction.

IV. Distinguish the meaning of the phrases on the contrary, on the other hand, conversely, obversely.

V. Give Blair's rules for unity.

VI. "The putting of what is specific and concrete for what is general or abstract is a means of strength." Explain the terms in the above passage, and show by reasoning and by original illustration that the statement is correct.

VII. Show how it is that many objects and compositions have the power to please after frequent repetition.

RHETORIC.

MONTHLY EXAMINATION.

APRIL, 1880.—*Time allowed, two hours.*

[N. B.—Omit any one of the eight questions you please; the answers to seven only are required.]

I. Distinguish between: (1) Loose sentence and period, (2) Tautology and redundancy, (3) Wit and humor, (4) Example and illustration, (5) Description, narrative, and exposition. Take three.

II. Explain: (1) Mixed metaphor, (2) Balanced sentence, (3) Illative conjunction, (4) Pointed style, (5) Obverse iteration, (6) Induction, (7) Deduction. Take four.

III. Give the main rules for the structure of the paragraph.

IV. "The proof of a principle indirectly contributes to its exposition." Show this.

V. Explain definition by analysis, burden of proof, argumentum ad hominem.

VI. "As in argument, so in oratory, there must be some common ground to work upon." Explain the nature of the "common ground" alluded to, and show how it affords data for the orator.

VII. Name and explain the four methods of inductive proof.

VIII. Explain fully what is meant by saying that a composition is in "good taste," with reference both to permanent and variable standards.

NAVAL HISTORY.

MAY, 1880.—*Time allowed, four hours.*

[* Starred questions are alternatives.]

I. Explain the offensive and defensive tactics of the galley period. Explain (1) the corvus, (2) the dolphin, and name the battles in which they were particularly effective.

I.* Give the names and dates of the battles in which the following were first used: cannon, chain-shot, shell, flag-signals, the technical order of battle of the sail period, iron armor.

II. Give a brief history of the development of naval guns and their appurtenances, including fabrication, locks and sights, carriages, and projectiles.

II.* Name the offensive weapons of modern naval warfare, and give a statement of the relative power and range of each. Name and describe briefly (1) the first steam ship-of-war, (2) the first ship-of-war with screw propeller, (3) the first armored ship-of-war.

III. Give a brief account of any three of the following: Robert Blake, Van Tromp, Villeneuve, Earl St. Vincent.

IV. Give an account of the battle of Naupactus.

V. Give a tactical account of the battle of Copenhagen, with a diagram showing the position of adjoining land, the channels, and fleets. State the opposing forces, commanders, and results.

VI. State the relative strength and distribution of the opposing naval forces at the beginning of the Russo-Turkish war of 1877–'8, and give a full account of one of the five torpedo engagements of the war.

VII. Battle of Trafalgar: date, opposing forces and commanders, tactics of battle, results. Draw and describe diagram of battle.

VIII. Battle of Lissa: date, opposing forces and commanders, details of the fight, results. Show that the battle of Lissa represents an epoch in naval warfare.

DEPARTMENT OF MODERN LANGUAGES.

FRENCH.

JUNE, 1880.—*Time allowed, five hours.*

Translate into French.

PAU, THE BIRTHPLACE OF HENRY THE FOURTH.

Pau is one of the most interesting cities of the south of France. It lies in one of e most beautiful and fertile countries in Europe, in one of the finest climates; and e city itself is clean and airy. As for the environs of Pau, they are certainly eautiful. The Gave winds through the charming country that surrounds the town. he chief interest of Pau arises from its having been the birthplace of Henry IV, and om the castle, which is still to be seen nearly in the same condition in which he left . The castle of Henry IV is of more ancient date than the town. Pau was founded bout the middle of the tenth century. The site of the castle is finely chosen. From s towers, and even from the windows, you discover the whole province of Bearn, ertainly one of the most fertile in the world; and the majestic range of the Pyrenees the background of this rich picture. The cradle of the king is seen in the chamber here he was born.

SHIPWRECK OF PRINCE WILLIAM.

Henry THE FIRST, king of England, and son of William the Conqueror, having been etained in France during three years, was preparing to return to England. On his rrival at the port of Harfleur, a sailor presented himself before him and offered his essel for the passage across the straits. The king replied that he had already made hoice of a vessel, but he would willingly confide to him his son, Prince William, and he Princess Adela, with their retinue, which consisted of the lords and ladies of the ourt, barons and baronesses, knights and other gentlemen, with their wives. The essel did not depart until the evening, and by the imprudence of the sailors, excited y the wine which the prince had distributed among them, she struck against a rock, oundered, and of three hundred persons, men and women, one only, a butcher of ouen, named Bérold, was saved.

FRENCH DICTATION.

Quelques jours apres, la gazette annonça que l'empereur était à Paris, et qu'on allait ouronner le roi de Rome et l'impératrice Marie-Louise.

On ne pensait déjà plus à ceux de la Russie, excepté leurs familles.

Mr. Goulden, quand nous étions seuls à travailler, me disait quelquefois:

Si ceux qui sont nos maîtres, et qui disent que Dieu les a mis sur la terre pour faire otre bonheur, pouvaient se figurer, au commencement d'une campagne, les pauvres ieillards, les malheureuses mères auxquels ils vont en quelque sorte arracher le cœur t les entrailles pour satisfaire leur orgueil; s'ils pouvaient voir leurs larmes et en-endre leurs gémissements au moment où l'on viendra leur dire: Votre enfant est ort . . . . . . vous ne le verrez plus jamais! Il a péri sous les pieds des chevaux, ou ien écrasé par un boulet, ou bien dans un hôpital, au loin,—après avoir été découpé,—ans la fièvre, sans consolation, en vous appelant comme lorsqu'il était petit! . . . . 'ils pouvaient se figurer les larmes de ces mères, je crois que pas un seul ne serait assez arbare pour continuer. Mais ils ne pensent à rien; ils croient que les autres n'aiment es leurs enfants autant qu'eux; ils prennent les gens pour des bêtes! Ils se trom-ent: tout leur grand génie et toutes leurs grandes idées de gloire ne sont rien, car il

n'y a qu'une chose pour laquelle un peuple doit marcher,—les hommes, les femmes, les enfants et les vieillards,—c'est quand on attaque notre liberté, comme en '92; alors on meurt ensemble ou l'on gagne ensemble; celui qui reste en arrière est un lâche; il veut que les autres se battent pour lui . . . . . . la victoire n'est pas pour quelques-uns, elle est pour tous, le fils et le père défendent leur famille; s'ils sont tués, c'est un malheur, mais ils sont morts pour leurs droits. Voilà Joseph, la seule guerre juste, où personne ne peut se plaindre; toutes les autres sont honteuses, et la gloire qu'elles rapportent n'est pas la gloire d'un homme, c'est la gloire d'une bête sauvage!

GRAMMAR.

1. Give the French of the demonstrative adjectives, *this, that, these, those.*
2. When is the form *ce* used? and when the form *cet?*
3. Give the French for *which, what.*
4. How many classes of verbs are there in French? How are they distinguished?
5. How is the object of a transitive verb called?
6. When is a noun said to be used in a general sense?
7. When is a noun said to be used in a definite sense?
8. What is the French for *"I like fruit"?* Why is the article used in this case?
9. Two verbs being joined in construction and having the same subject, in what mood is the second placed?
10. When is the *l* or *t* doubled in verbs ending in *eler* and *eter*?
11. What place do the objective pronouns occupy? Is there no exception?
12. How are they placed in regard to each other? What is the French of *"it to me, it to us, it to you"*?
13. What is the meaning of *chez?* Give an example.
14. What is the meaning of *devoir* before an infinitive? Give an example.
15. How many primitive parts has a French verb? Name them.
16. When are *dans* and *en* to be used? Give two examples.
17. Which numeral adjectives do the French use for the days of the month and names of sovereigns?
18. Does the past participle vary in gender and number?
19. With what does it agree? When does the agreement take place? Give examples.
20. Give the use of the subjunctive mood.

Questions on La Fontaine's fables.
Reading.
Conversation.
Conjugate *faire, lire, plaire, suivre, aller, envoyer.*

ELECTIVE COURSE IN SPANISH.

JUNE, 1880.

Translate into Spanish.

La noblesse d'âme et les héroïques vertus de Gusman étaient si bien connues de tous que même les maures, ses ennemis, l'avaient surnommé le Bon. Sa fidélité à son roi, et son héroïsme éclatèrent surtout à Zarifa qu'il occupait avec une poignée de soldats, lorsque le redoutable Infant Don Juan de Castille qui commandait pour le roi de Maroc vint, à la tête de 5,000 hommes, mettre le siège devant cette place forte. Déjà six mois s'étaient écoulés depuis que la ville avait été investie, sans que les assiégés donnassent aucun signe d'affaiblissement. Loin de là, tous les assauts avaient été repoussés, et Don Juan, désespérant de s'en rendre maître par la force des armes, résolut de recourir à la voie des négociations. Il fit donc dire à Guzman que le temps de se rendre était venu: qu'il ne pouvait espérer de tenir plus longtemps contre une armée supérieure par le nombre de ses troupes, et que l'humanité même lui faisait un deoir de céder, quelque dure et pénible que pût lui paraître cette nécessité. Ces preières ouvertures ayant été rejetées, Don Juan eut recours à un autre expédient. Il t savoir à Guzman qu'il consentirait à lever le siège, si la moitié des richesses renferées dans la ville lui était livrée, Guzman devant rester libre de s'approprier l'autre oitié, si bon lui semblait. La réplique du héros ne se fit pas attendre. Elle était insi conçue: "La victoire ne s'achète pas; elle est au plus valeureux." Irrité de ce ouble refus, il résolut, en desespoir de cause, de tenter un dernier moyen, moyen iname, il est vrai, mais infaillible selon lui, car le lâche et le mechant ne sauraient juger e cœur de l'homme d'honneur. Il avait, en son pouvoir, le fils unique de Guzman, u'il s'était chargé, six mois auparavant, de faire transporter au Portugal. Il le fit onduire sous les murs de la ville, et fit dire au père, que si la place ne lui était pas emise sur le champ, il ferait, sans délai, trancher la tête à son enfant. Lorsque cette enace eut été communiquée à Guzman, il se rendit aux créneaux du fort, d'où il put oir son fils pour la derniere fois, et entendre les gémissements que lui arrachaient les pprêts de mort qu'il avait sous les yeux. On dit qu'à cette vue, son âme se troubla t que son visage fut inondé de pleurs. Mais refoulant aussitôt ce cri de la nature utragée, il s'écria d'une voix encore émue, mais où perçait la fermeté du héros: "Mon ls, mon fils bien aimé, montre-toi digne de celui de qui tu tiens la vie, et sache en aire le sacrifice à la patrie; le déshonneur, dans ce monde, et des supplices éternels ans l'autre, seront le partage du misérable qui va te ravir le jour." Il dit, et le cœur avré de douleur, il reprit la route qui devait, dans quelques instants, le remettre en résence de cette tendre mère à laquelle il n'était plus possible de déguiser l'affreux oup qui l'atteignait à ce moment-là même. Aux grandes âmes, les grandes épreuves: elle est la loi de Dieu. Guzman devait l'éprouver, mais il était à la hauteur du rôle ue ce cruel événement lui prescrivait, et s'il ne lui fut pas donné á adoucir la douleur e celle qui ne pouvait être consolée, parceque son enfant n'était plus, il sut du moins enger tout à la fois, ces deux victimes du cruel devoir que l'honneur, non moins que a religion, lui avait imposé. Le soleil s'était couché sur cette scène d'horreur et la uit descendue des cieux, étendait ses lugubres voiles sur les deux camps; tous étaient ssoupis. Deux êtres seuls ne dormaient point; une mère que la douleur tenait éveilée, et un père disposant tout pour tirer vengeance de l'infame assassin de son fils. 'aube blanchissait à peine les bords de l'horizon, que Guzman à la tête de sa petite ande de héros, pénétrait dans le camp de Don Juan. La valeur, chez eux, suppléant u nombre, la terre fut bientôt couverts des corps morts de leurs ennemis qui surpris, pouvantés, et ne pouvant se defendre, s'enfuirent honteusement, laissant leur camp u pouvoir des chrétiens. Don Juan échappa au carnage, mais convaincu, trop tard our son honneur, de l'impossibilité de prendre Zarifa, sous un chef tel que Guzman, en leva la siège, et alla porter ailleur sa honte et sa fureur.

SECOND CLASS.

DEPARTMENT OF SEAMANSHIP.

SEAMANSHIP.

CADET-MIDSHIPMEN ONLY.

JUNE, 1880.—*Time allowed, five hours.*

1. Ship topmast-cap and send up topgallant mast.
2. Shift topmast-studding-sail boom.
3. Sketch a topsail; name the different parts; describe all the fittings; reeve the ear; and make up the sail ready for bending.
4. Describe in detail, setting and taking in a topmast-studding-sail; make a sketch howing the lead of all the gear.
5. Describe a triatic stay, and make all preparations for hoisting out the steam aunch, stating the duties of the different parts of the ship.

6. Make all the preparations for getting underway, as far as the ground tackle is concerned, and make a sketch showing the lead of the chain around the capstan.

7. Loose sail to a bowline.

8. Lying at single anchor, get underway under sail, and stand out on the wind.

9. Take in topgallant sails by the wind, blowing fresh, also when before the wind.

10. In charge of a steamer underway at night, white and red light on starboard bow, what would you do? What would you do in case of a green light on port bow?

NAVAL TACTICS.

CADET-MIDSHIPMEN ONLY.

JUNE, 1880.—*Time allowed, three hours.*

1. Name the different formations of a fleet order of battle, draw diagram of fleet in line, natural order, indicating the station of the commander-in-chief, divisional and squadron commanders. Of what is a reserve division composed?

2. Fleet in double column, natural order, form it into triple column.

3. Fleet in columns of vessels abreast by divisions, form it into column of vessels on centre division, natural order.

4. Fleet in column of vessels abreast by divisions, natural order, heading north, form it into column of vessels on right division with the van leading on a WSW. course.

5. Fleet in line, heading N. form it into echelon of vessels from right of divisions on NNW. course.

6. Fleet in column of vessels abreast by divisions, by the wind and headed off, restore its order on the same tack.

7. Change from single column of vessels to column of vessels abreast by divisions on the other tack with leading division to leeward.

8. Make signal NW. ¾ W.

DEPARTMENT OF ORDNANCE AND GUNNERY.

ORDNANCE AND ARMOR.

CADET-MIDSHIPMEN ONLY.

JANUARY, 1880.—*Time allowed, four hours.*

1. Describe in detail a turret carriage.

2. Draw and describe the compressor of a turret carriage.

3. Describe the loading, working, and sighting of turret guns.

4. Describe in detail the manufacture and inspection of spherical shell.

5. Name and explain the two systems of rifling used in the service and describe the new Parrott and Butler rings.

6. Draw and describe the Schenckle percussion fuze.

7. Draw VIII-inch M. L. S. B. to scale, giving nomenclature. Describe the elevating screw of IX-inch S. B. and 100-pounder M. L. R.

8. Describe in detail the manufacture of the Navy time fuze.

9. Describe preparation of XV-inch shell from inspection to loading.

GUNNERY.

CADET-MIDSHIPMEN ONLY.

JUNE, 1880.—*Time allowed, four hours.*

[Questions 3* and 6* are not required.]

1. Give the duties of division officers in regard to men, guns, carriages and instruction.

2. How should a gun be sighted from a stationary platform, from a ship underway

still water, and in a seaway, the target being stationary? What parts of a vessel ould be aimed at? Describe the sights of an 8-inch M. L. R.

3*. Name and describe the character of the various injuries which may be found in oth M. L. and B. L. rifled guns. State causes, places where generally found, serious- ess, and steps to be taken in each case.

4. What precautions are to be taken in opening and entering magazines and shell ooms; to keep flooding apparatus in good order; in stowing metallic cartridges, rimers, fireworks? Who inspect magazines before powder is received, and to what their inspection directed?

5. State in full detail how powder is stowed in magazines afloat. Describe the rrangements for supplying a battery with cartridges. By what considerations are ey controlled? Where should scuttles be placed?

6*. Draw and describe the 8-inch M. L. R. and describe its manufacture.

7. What care is to be taken of bores and breech mechanism of rifled guns in firing, leaning, and transportation?

8. Give the nomenclature of the S. P. central compressor carriage and slide, and escribe the compression gear. Give drawings.

9. Company in line at a halt, wheel and march to the front in column of fours; arching in column of fours, march to the front in line.

10. Battalion in column of fours on the march, form front into line, face to the rear. attalion in column of fours deploy into close column of divisions on the leading ivisions.

EPARTMENT OF ASTRONOMY, NAVIGATION, AND SURVEYING.

ASTRONOMY.

CADET-MIDSHIPMEN ONLY.

JANUARY, 1880.—*Time allowed, four hours.*

1. Explain the method of determining the right ascension and declination of stars, entioning the instrument used. What is the error and what is the rate of a clock? or what is the equatorial instrument used?

2. How should the finder of a meridian circle be set in order to point the telescope a star whose declination is 10° south, the latitude being 40° north, and the read- g for the horizontal point 0°? How would you construct a vernier to read to 10″, e value of a division of the limb being 10′?

3. Give the principal proofs of the earth's rotation upon its axis. How is twilight used? How long does it last?

4. Explain the equation of time.

5. Explain the retrogradation of the moon's nodes. How is the moon's horizontal arallax determined? Define altitude and azimuth.

6. Give the different kinds of lunar and solar eclipses which may occur. What are e phases of the moon at each? In what part of her orbit must the moon be at the me of an eclipse? Which limb of the moon is first eclipsed? Which limb of the n? In what direction does the moon's shadow cross the earth? Does a star, when cculted by the moon in its first quarter, disappear behind the bright or dark limb?

7. Explain the cause of the tides and of their daily inequality. What are spring nd neap tides? How would you determine the establishment of a port?

8. Name the bodies of the solar system in the order of their distance from the sun d in the order of their size. Give the number of satellites of each. Define right scension, declination, and hour angle.

9. Of what parts is a comet composed? How are comets distinguished and recog- ized? What are shooting stars? What causes star showers, and when do they ccur? Define celestial latitude and longitude.

10. On the plane of the horizon, in latitude 30° north, having the declination ($d =$ 10° N.) and hour angle ($t = 4$ hours) of a heavenly body, project stereographically the astronomical triangle, the equator, and the ecliptic, diameter of the primitive circle to be four inches. The right ascension of the body being 20 hours and the right ascension of the North Pole of the ecliptic 18 hours, show the latitude and longitude of the body.

11. How are stars classified? How are they catalogued? What are binary stars? What are double stars? Explain the experiment for determining whether Sirius is receding from or approaching the earth.

12. Mention three systems of celestial co-ordinates for fixing the position of a heavenly body, giving the planes of reference in each system. Explain the calendar.

DEPARTMENT OF PHYSICS AND CHEMISTRY.

HEAT.

JUNE, 1880.—*Time allowed, four hours.*

1. In correcting the barometric height for temperature, is the coefficient of apparen or of real expansion of Hg. used? (Give reasons for the answer.) A barometer stand at 758^{mm} at 20° C., what is the corrected reading? Coefficient of expansion of bras being .000019; and of Hg. .00018.

2. In a barometer tube the space AB contains saturated aqueous vapor with a dro of water on surface of mercury at B. What will occur (temperature remaining con stant) if the tube be slightly lowered? What if the tube be raised? What if th temperature be raised? State how the height of the column BC will be affected i each case.

3. Define relative humidity. Through U tubes containing pumice saturated wit sulphuric acid, a cubic meter of air at 15° C. is passed, and the tubes are found t weigh 3.95 grains more than before. Required, the relative humidity of the air Weight of a litre of dry air at 0° and 760^{mm}, 1.2932. Maximum tension at 15° C 12.699^{mm}.

4. Deduce and explain Apjohn's formula $f'' = f' - \frac{d}{87} \times \frac{h}{30}$: Spec. heat of air, .2375 Spec. gravity of aqueous vapor .6235. Assume the latent heat at temperature of we bulb to be 996° Fahr.

5. What will be the weight of a litre of moist air at 20° C.; Bar. 750^{mm}; relative humidity being .53. Maximum tension of aqueous vapor at 20° C. $= 17.391^{mm}$.

6. What substance will transmit the luminous and absorb the non-luminous ray from the sun? What accomplishes the reverse? What transmits both?

7. Make a drawing of Regnault's apparatus for determining the spec. heat of gase The reservoir of a Regnault's apparatus has a capacity of 35 litres. Its temperatur is 20° C. It is filled with nitrogen at a pressure of 5 atmospheres. The gas is pe mitted to flow through the heater and calorimeter until the pressure in the reservo is 1¼ atmospheres, when the operation ceases. Temp. of water 80° C.; the calorimete contains 957 grms. water at 0° C. The water is raised to 3° C. Bar. 760^{mm}. Weig of a litre of H at 0° and $760^{mm} = .0896$ grms. Relative weight of N 14. What is th specific heat of N?

8. Define latent heat. A kilogramme of the vapor of alcohol at 80° C., its boilin point, passes through a copper worm placed in 10.4 kilos. of water at 13° C. Temper ture of water is thereby raised to 35° C. The copper worm and copper vessel contai ing the water weigh together 2 kilogrammes. Required, the latent heat of alcoh vapor.

9. A ball from the 15-in. gun of the monitors, weighing 182 kilogrammes, strikes iron target with a velocity of 427 meters per second. Assuming that all the heat d

eloped is equally distributed between the ball and the target, how many degrees C. will the 15 in. ball be raised in temperature? Spec. heat of iron .1138.

10. In the cycle of operations of the theoretical engine, show by a diagram what represents the mechanical equivalent of *Mdv*. Deduce an expression for Carnot's function when a perfect gas is taken. Also in terms of the absolute temperature.

EXTRA.—State the principles of "Conservation of Energy," and "Dissipation of Energy," and point out their bearing upon the possibility of perpetual motion.

DEPARTMENT OF STEAM ENGINEERING.

DESIGNING MACHINERY.

CADET-ENGINEERS ONLY.

JUNE, 1880.—*Time allowed, four hours.*

[Any four of the last eight and any two of the first six questions may be omitted.]

1. The efficiency of a given engine is .1 and of the boiler, .8. The composition of the coal is C 90, H 6, O 4, how much coal must be burned per hour to develop 400 H. P.?

2. Find from indicator card and data on sheet A, considering clearance and recompression, the required weight of feed-water per hour. Density of feed-water, $\frac{1}{32}$. Density of water in boiler $\frac{1\frac{3}{4}}{32}$. The weight of steam passing through the jacket is $\frac{1}{10}$ that used in the cylinder.

3. From the indicator card and data on sheet B find the H. P. This engine has a friction dynomometer attached, with a weight of 3,050 lbs. on a balanced lever ten feet long. Find what per cent. of the H. P. is wasted in friction.

4. An engine uses dry saturated steam of 63 lbs. per gauge initial pressure, expanding it in a steam jacketed cylinder, without clearance, to a pressure of—3 lbs. per gauge and exhausting it against a back pressure of—11 lbs. per gauge. Piston speed 500 feet per minute. H. P. = 200. Find weight of steam used in the cylinder, per hour per H. P., and the area of the piston.

5. A ship makes 10 knots per hour, burning 16 tons of coal per day, and carries 138.24 tons of coal in bunkers: what distance can she *make good against a current of* 8 *knots per hour?*

6. Sketch a three-ported slide-valve, without lap or lead, in its proper position when the piston is at half stroke. Also sketch a perfect indicator diagram (giving scale) from a condensing engine using steam of 60 lbs. gauge pressure and cutting off at $\frac{1}{6}$ stroke. Change it by dotted lines to a card from a non-condensing engine using same steam and expansion; also show by broken and dotted lines excessive steam lead and late exhaust. Show atmospheric and zero lines.

7. A pair of bevel wheels, A and B, with axes at right angles, have an angular velocity ratio of $\frac{A}{B} = \frac{5}{3}$. A has 12 teeth, and the diameter of the base of its pitch cone is $4''.5$. Construct full size at least 1½ teeth of the pattern for the teeth of the larger wheel, using the odontograph, and show section of wheel. Lay off all dimensions to the nearest $\frac{1}{16}$ of an inch.

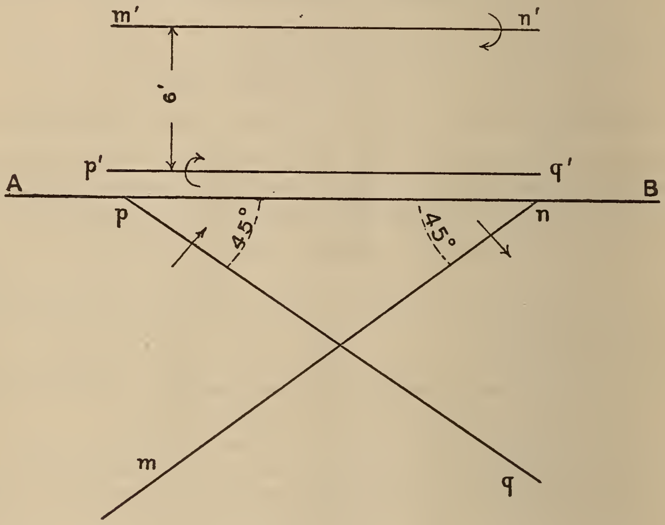
8. A lathe having a countershaft and back gear is driven by a line of shafting, making 100 revolutions per minute. There are to be 12 changes of speed of mandrel, increasing from 4 per minute by a common ratio of 1.5. The sum of the diameters of all opposite pulleys is to be 20″. Find and arrange size of all pulleys and train for back gear.

9. A clock having hour, minute, and second hands has 24 coils on barrel, and runs for one day. The pendulum makes 2½ beats per second. The distance between the

axis of barrel and that of the hour and minute hands is 6″.5, and the diametral pitch of wheels on those axes is $\frac{1}{8}''$. No wheel to exceed 96 and no pinion to have less than 8 leaves. Give the entire notation.

10. A cam revolves once a minute, and gives motion to a rod whose line of motion passes through centre of motion of cam. Travel of rod 2″. The rod rises for 25 seconds with a *uniform motion;* remains at rest for 20 seconds; and descends during the remainder of the revolution with an *uniformly-accelerated motion.* Lay down the cam full size on a base circle of 3″.

11. The two shafts MN and PQ, connected by a flat endless belt, revolve as shown with ang. veloc. ratio $\frac{MN}{PQ} = \frac{4}{5}$ and the pulley on MN is 20″ diameter. Give the H and V projections of the pulleys and belt, giving dimensions.



12. Construct, full size, the necessary mechanism for producing a quick return in a sliding piece having a path of 4″ with a coefficient of friction of .57735. The ratio of periods of $\frac{\text{advance}}{\text{return}} = \frac{7}{5}$.

13. Construct the necessary mechanism for showing the motions about the sun of two planets A and B, whose *periods* are 244 and 100 respectively; the planets to have no absolute motion about their own axes.

14. Eccentrics of 4″ throw and link work, as shown in figure —. How far will the point *c* be from its present position when the centre of eccentric *a* has arrived at *a′*? Neglect angularity of rods and consider points *c*, *i*, and *e* to move in straight paths, as shown by red lines.

15. The cross-head of an engine of 4′ stroke is to be guided by an exact parallel motion, whose fixed centres are respectively 2′ and 3′ from the centre line of cylinder: construct the mechanism to scale, showing by full lines the position at end of stroke, and by broken lines at half stroke.

16. A rope *ab* takes 1½ turns around a pulley A, one end being made fast and the other carrying a weight W; it is found that with ½ turn of the rope around the pulley a weight of 1 lb. at *a* will support 2 lbs. at *b*, a rope *c* being unwound from drum B, and its tension is not to exceed 2,100 lbs.; find weight W.

17. A lathe has 4 threads per inch on a right-handed leading screw; find the sizes of the least number of change wheels to cut threads (right handed) of 5, 6, 8, 9, and 10 to the inch. The smallest wheel is to have 20 teeth. Show in tabular form the arrangement of the wheels for the various cuts.

DEPARTMENT OF MECHANICS AND APPLIED MATHEMATICS.

CALCULUS.

JANUARY, 1880.—*Time allowed, four hours.*

1. $y = \frac{ax-1}{\sqrt{1+x^2}} \varepsilon^{a \tan^{-1} x}$; find $\frac{dy}{dx}$. Deduce $d(\sin x)$.

2. A vessel sailing due south at the uniform rate of 8 miles per hour is 20 miles north f a vessel sailing due east at the rate of 10 miles per hour; when are the vessels either receding from nor approaching each other?

The master of a ship sailing due east at the rate of 8 miles per hour observes a bal- oon bearing NW; a stone drops from the balloon and strikes the sea at a distance of miles from the ship: having observed the angle of elevation of the balloon, its alti- ude was found to be 1 mile; if the balloon is rising vertically at the rate of 12 miles er hour, at what rate are the balloon and the ship separating?

3. Find an expression in terms of its azimuth for the rate at which the altitude of star is increasing; and thence show that the rate of increase is greatest when the tar is crossing the prime vertical.

Evaluate $\left.\frac{(x-2)\,\varepsilon^x + x + 2}{x\,(\varepsilon^x - 1)^2}\right]_0$.

4. The illumination of a plane surface by a luminous point being directly as the osine of the angle of incidence of the rays, and inversely as the square of its distance rom the point; find the height at which a bracket-burner must be placed, in order hat a point on the floor of a room at the horizontal distance a from the burner, may eceive the greatest possible amount of illumination.

It is required to construct from two circular iron plates of radius a a buoy composed f two equal cones having a common base, which shall have the greatest possible olume.

5. Expand $\log(1+\varepsilon^x)$ into a series involving ascending powers of x.

Compute to seven places $\log_\varepsilon 79$, given $\log_\varepsilon 3 = 1.0986122887$ and $\log_\varepsilon 5 = 1.6094379124$.

6. Derive the equation of the rhumb-line, or loxodromic curve, in terms of latitude nd longitude.

The earth being regarded as an ellipsoid of revolution, find the radius of curvature f a meridian in terms of the latitude.

7. $\int_0^a \frac{dx}{\sqrt{(x^2+a^2)}}$ and $\int_a^\infty \frac{dx}{x\sqrt{(a^2+x^2)}}$.

8. $\int_0^{\frac{\pi}{2}} \frac{\sin^3 x dx}{\sqrt{(\cos x)}}$ and $\int_0^1 \frac{x dx}{(1+x)(1+2x)^2(1+x^2)}$.

9. Given $y^2(a-x) = x^3$, determine the area between the curve and its asymptote.

Or—

9. Determine the area enclosed by the curve $r = 2a \cos\theta \cos 2\theta$ between the limits and $-\frac{\pi}{4}$.

10. Determine the length of the curve $r^{\frac{1}{4}} = a^{\frac{1}{4}} \cos\frac{\theta}{4}$, the limits being 0 and 2π.

Or—

10. Find the volume included between a right cone, vertical angle $\frac{\pi}{3}$, and a sphere hose radius is a, which touches it along a circle.

Extra question.

Determine the area of one loop of the curve, $x = 2a \sin \frac{y}{x}$.

Find the least isosceles triangle that can be described about a given ellipse, having its base parallel to the major axis.

MECHANICS.

JUNE, 1880.—*Time allowed, four hours.*

1. Two weights, one of which is double the other, are connected by a fine string which passes over a pulley at the extremity of the horizontal diameter of a smooth fixed vertical circle, the greater weight resting on the concave arc, and the lesser hanging freely outside the circle; find the position of equilibrium.

2. A weight of 6 lbs. is placed on an inclined plane, the height of which is 3 feet and the base 4 feet, and is attached by a string to an equal weight hanging over the top of the plane; find how much must be added to the weight on the plane that there may be equilibrium, and determine the pressure on the plane.

3. Find the position of the centre of gravity of the segment of a sphere in terms of its altitude and the radius of its base.

4. A body is supported on a rough inclined plane by a force acting along the plane; supposing the greatest magnitude of the force to be double the least magnitude, determine the inclination of the plane to the horizon in terms of the coefficient of friction.

Or—

4. Determine the ratio of the tensions of the two ends of a cord in contact with a rough right circular cylinder.

5. A body is projected vertically upward with a velocity $4g$; after two seconds suppose gravity to cease to act during one second and then to be doubled; find the greatest height to which the body ascends, and the velocity when it returns to the point of projection.

6. A body is projected with the velocity u and strikes at right angles a plane which passes through the point of projection, and is inclined at an angle β to the horizon; show that the height of the point struck above the horizontal plane through the point of projection is $\frac{2u^2}{g} \cdot \frac{\sin^2\beta}{1 + 3\sin^2\beta}$.

7. Find the moment of inertia of a hemisphere about a tangent at its vertex.

Or—

7. Find the moment of inertia of a right triangle about an axis through its centre of gravity perpendicular to its plane.

8. Find the depth of the centre of fluid pressure on the semi-cardioid $r = a(1 + \cos\theta)$, the initial line being in the surface of the fluid.

Or—

8. A paraboloid generated by the curve $b^{n-1}y = x^n$ is emptied through an orifice at the vertex in one-ninth the time required to empty the circumscribing cylinder; determine n and b.

Extra question.

The times of emptying the segment of a sphere through an orifice at its vertex and through an equal orifice in its base are as 2 to 3, the base being horizontal in both cases; find the ratio of the volume of the segment to that of the sphere.

Find the ratio of power to pressure in the common vise, allowance being made for friction.

DIFFERENTIAL AND INTEGRAL CALCULUS.

ELECTIVE COURSE.

JANUARY, 1880.—*Time allowed, four hours.*

Cadet-Midshipmen J. L. Schock, J. H. Linnard, E. Carroll, F. C. Rider, J. L. Rees, J. A. Hoogewerff, T. Serata, J. J. Woodward, W. H. Stayton, H. K. White, and R. B. Dashiel.
Cadet-Engineers J. M. Whitham and G. Kaemmerling.

1. Prove that—

$$(\sin^{-1}x)^2=2\left[\frac{x^2}{2}+\frac{2}{3}\cdot\frac{x^4}{4}+\frac{2.4}{3.5}\cdot\frac{x^6}{6}+\frac{2.4.6}{3.5.7}\cdot\frac{x^8}{8}\cdots\right],$$

and thence derive a convenient series for computing the value of π.

2. Expand $\frac{x}{\varepsilon^x-1,}$ and determine the value of the first two of Bernoulli's numbers.

3. Given $x\frac{d^2y}{dx^2}+\frac{dy}{dx}+y=o$ and $y_0=a$, expand y in powers of x.

Given $y=x\varepsilon^{-y}$, expand $\sin(x-y)$ in powers of x.

4. Prove that $\int_0^\infty \varepsilon^{-x^2}dx=\frac{\sqrt{\pi}}{2}$, and thence evaluate $\int_0^\infty \varepsilon^{-x^2}x^{2n}\,dx$.

5. Prove that $B(m,n)=\frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$, and thence determine the value of—

$$\int_0^{\frac{\pi}{2}}(\sin\theta)^{q-1}(\cos\theta)^{p-1}\,d\theta.$$

6. Given $x^3+y^3-3axy=0$, find the area between the curve and its asymptote.

Find the length of the curve $y=2a\sqrt{x}-x$, $z=x-\frac{2}{3a}x^{\frac{3}{2}}$.

7. Express by means of gamma functions the area and the length of a loop of the curve $r^n=a^n\cos n\theta$.

8. The axis of a cylinder whose base is the curve $r=a\cos 3\theta$ passes through the centre of a sphere: find what portion of the sphere is within the cylinder.

Determine the area of a loop of the curve

$$x^2y^2-4a^3y+(3a^2-x^2)^2=0.$$

MECHANICS.

ELECTIVE COURSE.

JUNE, 1880.—*Time allowed, four hours.*

Cadet-Midshipmen J. L. Schock, J. H. Linnard, J. L. Rees, J. J. Woodward, F. C. Rider, J. A. Hoogewerff, T. Serata, H. K. White, E. Carroll, W. H. Stayton.
Cadet-Engineer J. M. Whitham.

1. Deduce an expression for the radius of curvature which is applicable to a curve of double curvature.

Derive expressions for the acceleration along and perpendicular to the normal to the path described by a moving particle.

2. A boat is rowed with a constant velocity u from a point on the bank of a river, and is always directed toward a point exactly opposite on the other bank; if the river flows with a uniform current throughout its width, find the equation of the curve described. Find also the time of crossing the stream.

3. A particle moves in a straight line under the action of an attractive force which varies inversely as the nth power of the distance of the particle from a fixed point in the line; determine the time of one oscillation.

A particle moves in a straight line under the action of an attraction, varying inversely as the $\frac{3}{2}$th power of the distance; find the velocity acquired in falling from an infinite distance to the distance a from the centre.

4. A particle acted upon by an attraction varying inversely as the cube of the distance is projected from a given point; determine the curves described.

5. Determine the friction of a spherical step, and the equation of the solid of revolution known as an anti-friction bearing.

6. A particle is acted upon by a central attraction; determine the polar equation of the path described.

A particle is projected from a given point in a given direction and with a given velocity, and moves under the action of a central attraction varying inversely as the square of the distance; determine the orbit.

Kepler's problem.

7. Given $r = a\,(1 - e\cos u)$, $\tan\frac{1}{2}\theta = \left(\frac{1+e}{1-e}\right)^{\frac{1}{2}} \tan\frac{1}{2}u$, and $nt = u - e\sin u$; determine r and θ as functions of t.

DEPARTMENT OF MODERN LANGUAGES.

FRENCH.

JUNE, 1880.—*Time allowed, two and a half hours.*

Translate from English into French.

DEPARTURE OF GIL BLAS FOR SALAMANCA.

Previous to my departure, I went to kiss my father and mother, who did not spare me remonstrances. They exhorted me to be grateful towards my uncle, to live as an honest man, and, above all, not to take the goods of others; and they gave me their benediction, which was the only thing that I expected from them. Immediately I mounted my mule, and went out of the town. Behold me then out of Oviedo, on my way to Pegnaflor, master of my actions, a bad mule, forty ducats and some reals. The first thing I did was to count and count again my ducats in my hat. I could not contain my joy: I had never seen so much money; I could not tire myself in looking at it and handling it. I was counting it, perhaps for the twentieth time, when suddenly my mule stopped in the midst of the high road. I judged that something frightened him: I looked, and perceived on the ground a hat overturned; at the same time I heard a lamentable voice, which uttered these words: "Mr. traveller, have pity, I pray, on a poor lame soldier; throw, if you please, some pieces of money into this hat; you will be rewarded for it in the other world." I then turned my eyes on the side whence the voice came: I saw at the foot of a bush a kind of soldier, holding in his hand a musket with which he was taking aim at me. At this sight, which made me tremble, I stopped short: I promptly concealed my ducats, I threw some reals into the hat and had the precaution to throw them one after the other to show the soldier that I acted nobly; he was satisfied with my generosity, and gave me as many blessings as I gave kicks to my mule in order to get quickly away from him, but the cursed animal did not go faster for that: the long habit which he had contracted to walk step by step under my uncle, had made him lose the use of the gallop. I did not draw from this adventure too favorable an omen for my journey. I represented to myself that I was not yet at Salamanca, and that I might indeed meet with some worse accident.

Translate from English into French.

COLIGNY.

Gaspard de Coligny, Admiral of France, was one of the most remarkable men of his time. His name has gained a mournful celebrity in the pages of history, as that of the greatest martyr in the massacre of St. Bartholomew. He embraced the doctrines of Calvin, and by his austere manners and the purity of his life illustrated the doctrines hich he had embraced. In his youth he was the gay companion of the Duke of uise. But the two friends, separated by opinion and by interest, were changed into ortal foes.

DESPERATE PATRIOTISM.

Translate the following into French:

During the wars of Napoleon in Spain, a regiment of the guard of Jerome, ex-King f Westphalia, arrived under the walls of the monastery of Figueiras. The general nt a message to the prior to demand refreshments for his officers and men. The rior replied that the men would find good quarters in the town, but that he and his onks would entertain the general and his staff.

About an hour afterward a plentiful dinner was served; but the general, knowing y experience how necessary it was for the French to be on their guard when eating nd drinking with Spaniards, invited the prior and two of the monks to dine with im.

The invitation was accepted in such a manner as to lull any suspicion; the monks sat own to table and ate and drank plentifully with their guests, who, after the repast, hanked them heartily for their hospitality, upon which the prior rose and said: Gentlemen, if you have any wordly affairs to settle, there is no time to lose; this is he last meal you and I shall take on earth; in an hour we shall know the secrets of he world to come.”

The prior and his two monks had put a deadly poison into the wine in which they ad pledged the French officers, and notwithstanding the antidotes immediately given y the doctors, in less than an hour every man, hosts and guests, had ceased to live.

Translate the following into English:

Générosité de Scipion l'Africain.

Peu d’hommes ont légué à l’histoire une si belle réputation de pureté et de grandeur ue Scipion l’Africain. Son désintéressement et sa magnanimité lui ont valu l’admiraion de tous les siècles. Etant parti pour l’Espagne, il prit d’assaut Carthagène le jour ême de son arrivée. On lui amena parmi les prisonniers une jeune fille d’une rare eauté. Ayant appris qu’elle était d’une famille distinguée parmi les Celtibériens, et u’elle était promise en mariage à un jeune prince de ce pays, Scipion fit venir ses arents et le prétendu, et la leur rendit. Les parents de la jeune fille qui avaient pporté pour la racheter une somme d’or assez considérable, prièrent Scipion de vouoir bien recevoir cet or de leurs mains. Scipion le fit déposer à ses pieds, et ayant ait appeler le futur, il lui dit: “j’ajoute ce présent de noces à la dot que vous devez ecevoir de votre beau-père.” En même temps, il exigea que le prince prît l’or et qu’il e gardât. De retour dans son pays, ce prince, pour témoigner sa reconnaissance à cipion, fit entrer les Celtibériens dans le parti des Romains.

Dictation.

LA PATRIE.

La patrie, c’est la terre où nous sommes nés, où nous avons grandi, celle qui porte e blé dont se fait notre pain, les vignes d’où coule notre vin, les arbres dont le feuilage nous abrite, les places où nous avons joué, les routes où nos pères ont marché vant nous, et où nous courons à notre tour. La famille, les amis, l’éducation que ous avons reçue, nos plus précieux souvenirs, nos joies, toutes nos affections y sont assemblés; tous ces trésors, c’est la patrie. Elle est la grande famille de ceux qui nt le même langage, la même histoire, les mêmes lois, le même gouvernement, qui portent le même nom.

C’est pour cela que nous devons tous la défendre, l’honorer, l’aimer, la servir.

Vous surtout, marins et soldats, que la patrie a chargés du soin de veiller à sa écurité, de conserver intact l’honneur du drapeau national, servez-la toujours avec fidélité, avec dévouement, avec amour, suivez l'exemple de tant de braves qui vous ont précédés dans votre noble carrière. Comme eux, montrez en toute circonstance le courage, le sang-froid, l'énergie que réclame votre etat à un si haut degré; comme eux, joignez à un grand amour de la patrie, la pratique des vertus qui font les guerriers illustres et les vaillants hommes de mer.

FIRST CLASS.

DEPARTMENT OF SEAMANSHIP.

PRACTICAL SEAMANSHIP.

CADET-MIDSHIPMEN ONLY.

JUNE, 1880.—*Time allowed, three hours.*

1. Secure lower yards for hoisting in heavy weights. Describe the tackles used, show how they are placed, and how the falls lead.

2. Describe a chain cable; tell how it is made and how marked, and explain the manner of getting on board, stowing, and bending to anchor.

3. What is meant by organizing a ship's company? Describe the duties of an executive officer at the time of a ship's going into commission.

4. Ship lying head to wind, get underway under sail, and stand out on the port tack.

5. Anchored on a lee shore, get underway and stand off.

6. Set a close-reefed topsail in a gale and describe the method of taking in a topsail in a gale.

7. Ship being "in irons," show how you would manoeuvre her out of the position?

8. What are the indications of a cyclone? Where and at what seasons do they generally occur? Give rules for managing a ship in a cyclone both in the Northern and in the Southern Hemispheres.

9. Weather main-brace parts when the ship is by the wind: what would you do?

10. If two steamers meet, one steering SW., the other W. by N., which has the right of way?

SHIP-BUILDING.

JANUARY, 1880.—*Time allowed, four hours.*

WOODEN SHIP-BUILDING.

1. Describe the keel. Show how the lengths are connected, and how they are joined to the stem and stern posts. What is the length of keel scarf, and where do the ribs come? Why? Give elevation and plan sketches.

2. Describe a square frame (long and short arm floors), naming the different timbers of which it is built and the manner of uniting them. Describe raising and regulating the ⊕ frame, and show how frames are made to keep their form while being raised and regulated.

3. Describe the different methods of diagonal bracing and state which method is most commonly used, and the object of it. Describe the different kinds of rudders.

4. For what purpose is the main keelson worked? What fastenings are driven through it? What are sister keelsons? Describe how they are worked. State their length and show how they are fastened.

5. Describe the preparations necessary to get a ship ready for launching. How is a ship launched, and how do you prevent hogging? Name the different kinds of docks in use.

IRON SHIP-BUILDING.

1. Name and describe the different systems of framing used in iron ship building. What keel is generally used with each system? Describe the bar keel and show how is connected with the remainder of the hull.

2. Make a sketch of stem of armor-clad vessels and describe it. When in two or more parts, show how the parts are united and how the stem is joined to the keel.

3. How are the frames behind armor spaced, and how worked? How do you work lating, girders, and backing behind armor? How do you work armor and armor-helf? Describe armor bolts and method of testing them.

4. Explain how water-tight bulkheads are fitted. Make a sketch showing the ifferent methods of working outside plating, and describe each.

5. What is the object of the composite system of building vessels? Name and escribe the different methods and illustrate the best.

DEPARTMENT OF ORDNANCE AND GUNNERY.

ORDNANCE AND ARMOR.

CADET-MIDSHIPMEN ONLY.

JANUARY, 1880.—*Time allowed, five hours.*

1. Cast iron. Describe the varieties, and show how it is obtained. Express briefly he reactions of the blast furnace. State the conditions of fuel and blast required for gun founding.

2. Define steel. State the most important processes of making steel, and the essential principles of each. Describe the Siemens-Martens process. Describe the method of tempering steel in oil.

3. Describe the fabrication of the XV-inch gun, under the following heads: Furnaces, charge, mold, core, casting, marking.

4. Describe the 80-pounder B. L. R., conversion, slotted screw, screw box, gas check.

5. Draw the VIII-inch M. L. R., giving nomenclature.

6*a*. Name and explain the two general methods of equalizing the strains in a gun, and give the methods of application. Describe in detail the breech mechanism of a Krupp gun.

6*b*. Define *elasticity, ductility, permanent set, tensile strength, density.* Compare cast iron, wrought iron, steel, and bronze, in respect to strength, uniformity, elasticity, and ductility.

[6*a* and 6*b* are alternatives.]

ORDNANCE AND ARMOR.

CADET-MIDSHIPMEN ONLY.

JUNE, 1880.—*Time allowed, five hours.*

1. Describe the systems of rifling in use in the United States Navy, and state the advantages and disadvantages of each system.

2. Draw and give nomenclature of the S. P. central compressor carriage; give separate drawing and describe fully the working of compressor gear.

3. Describe, with drawings, circular-brake directing bar carriage.

4. Define explosive effect, state briefly upon what it depends, and discuss fully, giving instances, and showing how such effect is modified by varying circumstances.

5. What is progressive powder? What has led to the use of progressive powders? What results as regards gun and projectile are sought to be thus obtained? Show

graphically and explain the differing results from the same amount of gas evolved from different powders. What conditions of powder favor progressiveness, and why?

6. How, and of what material, are cartridge bags made? How are they filled? Describe the Boremann fuze? When is it used?

7. How are shell, common and battering, and shrapnel filled and fuzed?

8. By what methods may the distance of an object at sea be determined? (Name, but do not describe.) Describe the Boulengé telemeter.

The following questions are not required, but additional credit will be given for each one satisfactorily answered.

9. Draw and describe the carriage for the 80 and 100 ton English and Italian guns. What is dynamite, and what are its properties?

10. What is gun cotton? Describe its manufacture, properties, and mode of firing.

11. Concentrate a battery of 12 guns on the midship gun, abeam, 500 yards, and describe the arrangements for electrical firing under such circumstances.

DEPARTMENT OF ASTRONOMY, NAVIGATION, AND SURVEYING.

NAVIGATION.

CADET-MIDSHIPMEN ONLY.

JANUARY, 1880.—*Time allowed, five hours.*

1. In an ordinary day's work by dead reckoning, what sailings are involved? and how are they involved?

2. A vessel leaves port at 1 p. m. on a given day: how will you find her position by dead reckoning at noon on the following day? Find the course and distance made good, and the current. (Give the details of the entire work, particularly as to the use of the traverse table.)

3. Deduce the expression for the meridional parts of the spheroid; given—

$$r = \frac{a \cos L}{(1-e^2 \sin^2 L)^{\frac{1}{2}}}, \text{ and } R = \frac{a\,(1-e^2)}{(1-e^2 \sin^2 L)^{\frac{3}{2}}}.$$

4. How will you construct a Mercator's chart, to extend from latitude 45° N. to latitude 50° N., and to cover twenty degrees of longitude, fifteen inches being available for the space in latitude?

5. How do you find the Mercator's course and distance between two points by inspection of the tables, and upon the chart?

6. Deduce by Napier's rules the formulas for finding the course and distance between two points by great circle sailing? How are the latitude and longitude of the vertex found?

7. How is the great circle route laid down upon the chart? What advantage does a knowledge of this route give, and what determines the advisability of pursuing it? What is a compound great circle route? How is it laid down and followed?

8. Give one practical method for the conversion of local sidereal time into local mean time and the reverse, with reasons therefor.

9. Deduce the formula for finding the hour angle of a body when on or nearest the prime vertical. When will it be useful to know the hour angle? Deduce the formula for finding the hour angle of a body when in the horizon. How is the time of actual sunset determined (disappearance of the sun's upper limb below the horizon)?

10. Deduce by Napier's rules the formulas for finding the latitude by an altitude of a heavenly body taken at any time. How are ϕ'' and ϕ' marked respectively, and why? When may this problem be used at sea?

11. Deduce by Napier's rules the formulas for finding the azimuth of a heavenly body at a given place and time. How is the t of this problem found in the case of a star? Of what use is a knowledge of the azimuth?

12. Deduce the formula for finding the latitude from an altitude of the sun observed ry near noon. State how the operation is performed practically, especially with gard to obtaining the value of t which is used.

13. Deduce the equation of equal altitudes. State what quantities are involved in e equation, and how each one is obtained.

14. Apply (13) to finding the chronometer correction on Greenwich mean time, giving ch step and the reasons in detail.

15. Define circle of equal altitudes and illustrate by a diagram. How may the sition of the centre of this circle be found? What is a line of position? Of what se is a single line of position? How can you obtain the azimuth from it?

16. Give in detail the method of finding the latitude and longitude of a vessel at a by Sumner's method, when the vessel is under way in the interval between the bservations.

17. What method would you select for obtaining the latitude and longitude at the me time? Give reasons for your preference. What is the most favorable position f a heavenly body for the determination of longitude? of latitude? Give the reasons each case. How do you find the true amplitude of a heavenly body? Of what use a knowledge of the amplitude?

18. What is the distinction between the *error* and the *correction* of a chronometer? hich is generally used? How is the *rate* of a chronometer obtained? Which method o you consider the best for determining the error of a chronometer? Give reasons for our preference. What is the object of the daily comparison of chronometers? hat is the meaning of the term second differences, in this connection?

19. Of what use are lunars? How much reliance can be placed upon the results btained from lunar observations? Draw the figure and explain the method of finding he true from the observed lunar distance (formula not required). Suppose the chronometer is injured, how can you find the longitude by lunars?

20. How is the longitude found by a time-sight of the moon? How do you obtain he longitude which is entered in the log-book as the longitude at meridian?

Extra questions.

[No credit will be given for answers to these questions unless all the regular questions are attempted.]

1. Deduce the formulas for finding the latitude by two altitudes of the sun, the eclination remaining unchanged.

2. Deduce Bradley's formula for refraction.

3. Deduce the formulas of Chauvenet's method of finding the latitude from the diference of altitudes of the sun near the meridian.

SURVEYING, AND COMPASS DEVIATIONS.

CADET-MIDSHIPMEN ONLY.

JUNE, 1880.—*Time allowed, five hours.*

1. Describe the adjustments and observations necessary to ascertain and correct the ollimation error of a bureau theodolite.

2. How do you determine the azimuth of a base line? How do you plot the base ine and the principal stations on a chart?

3. How do you run a single line of soundings? How are soundings reduced and lotted?

4. With what instruments and how are tidal observations made, and what information is obtained from them? Describe a bench-mark and its use.

5. Describe current observations. Using the tidal observations for comparison, ive the rule for computing the drift for spring-tides or neaps from a short series of urrent observations.

6. Explain the method of making a running survey.

7. Give a definition of the polyconic projection. Deduce the general equations of a meridian, and explain fully by diagrams all the quantities involved.

8. How do you construct a scale of $\frac{1}{500000}$ in order that the least count shall be 100 meters? How do you construct a polyconic chart of large area?

9. Define true, magnetic, and compass bearings. How do you find the correct magnetic bearing of an object? How is deviation of the compass marked? How is deviation applied to a magnetic bearing to find the compass bearing?

10. What is a deviation table, and how are the data for constructing it obtained? Explain the method of constructing a deviation table at sea. What is a Napier's diagram, and what is its use? How would you construct a table that would answer the same purpose?

11. Wherein does the deviation of the compass in an iron vessel differ from that in a wooden vessel? What is meant by semi-circular, and what by quadrantal deviation? What are neutral points, and where are the neutral points of each part of the deviation?

12. What is "hard" and what is "soft" iron? Which part of the deviation is affected by the magnetism of the hard iron? Which part of the soft iron produces semi-circular, and which quadrantal deviation?

13. Explain by a diagram of nine soft iron rods the effect of the soft iron of a ship on the compass. Give the reasons for the algebraic signs of the rods e and c.

14. Give the three general equations of Poisson, and explain each term of the first equation.

15. In the general equation

$$\delta = A + B \sin \zeta' + C \cos \zeta' + D \sin 2\zeta' + E \cos 2\zeta',$$

which are the changing and which the permanent coefficients, and why?

Given $D = \frac{1}{\lambda} \frac{a-e}{2}$, show how D can be corrected mechanically.

16. What causes the heeling error in an iron vessel? How is the needle affected by heeling when in northern latitude, and why? How do you correct the compass for heeling error?

PRACTICAL NAVIGATION.

CADET-MIDSHIPMEN ONLY.

Time allowed, four hours.

1. September 5, 1880, took departure, from Sugar Loaf, in Lat. 22° 56′ S., Long. 43° 09′ W. bearing p. c. WNW. ½ W. and distant 20 miles, the ship's head being east and the deviation on that heading ¾ point E. Variation from the chart, ½ point E. Thence sailed till noon, September 6, 1880, as follows:

Compass courses.	Knots.	Wind.	Leeway.	Deviation.
ENE. ¾ E.	22	Nd. and Wd.	None.	¾ pt. E.
E. by S.	24	do.	do.	½ pt. E.
SE. by E.	2.4	do.	do.	do.
E. ½ S.	40	do.	do.	¼ pt. E.
N. by E. ½ E.	18	do.	½ pt.	½ pt. E.
NNE. ½ E.	72	do.	¾ pt.	do.
NNE.*	22	do.	½ pt.	do.

*Run to noon September 6, from hour of morning time-sight.

Required, Lat. and Long. by D. R. at noon, September 6, 1880, also the course and distance by D. R. from the Sugar Loaf.

At noon, September 6, 1880, Obs. merid. alt. sun's lower limb 61° 38′ 0″. In. cor. + 2′ 0″. Height of eye, 21 feet. Required, the latitude.

2. September 6, 1880, about 8 a. m. W. T. obs. $7^h\ 08^m\ 21^s$, C—W $3^h\ 09^m\ 40^s$, c. c. $+\ 0^h\ 14^m\ 0^s$. Obs. alt. sun's lower limb 22° 35′ 0″. In. cor. + 2′ 0″. Height of eye, 21 eet. Bearing of sun by compass N. 63° E. Ship's head, NE. by N., and the deviation n that point, 5° E.

Required, the longitude at noon, September 6, 1880, variation of the compass, set n degrees) and drift of the current.

3. Find the time of a. m. high water at Cork, in Lat. 52° N, Long. 8° W, on the 0th May, 1880, the establishment of the port being $4^h\ 37^m$. Which is the higher, the . m. or the p. m. tide of that day, and why?

4. June 4, 1880. Compute the local mean time of the apparent setting of the sun's pper limb at Annapolis, Lat. 38° 58′ 53″ N, Long. $5^h\ 5^m\ 56^s$ W, supposing the time for he sun to pass through altitude, equal to ref. + dip. + semid., to be $5^m\ 0^s$.

5. At Annapolis, about 8 a. m. May 4, 1880. Chro. T. obs. $8^h\ 31^m\ 22^s$, c. c. + $4^h\ 36^m$ 5^s. Angle between sun's nearest limb and a chimney, right of sun, 69° 54′ 20″. In. or. 5′ 40″. The altitude of the chimney (by the same sextant) above the shore line ° 21′ 30″. Distance of the shore line, under the chimney, from the observer, 3,300 eet. Height of eye, 29 feet. Required, the true bearing of the chimney.

6. December 16, 1880, in Long. 2° 40′ W. about 7 p. m. Chro. T. obs. $6^h\ 57^m\ 0^s$, c. c. + ${}^h\ 10^m\ 30^s$. Obs. alt. star α Pegasi (Markab) 38° 14′ 0″ bearing NW nearly. In. cor. + 2′ 0″. Height of eye, 18 feet. Required, the latitude, by the ϕ' method.

7. Each cadet midshipman will take observations of the sun by sextant and artifiial horizon, and compute the error of the chronometer on Greenwich mean time.

[Questions 4 and 5 may be omitted.]

DEPARTMENT OF STEAM ENGINEERING.

MARINE ENGINES.

CADET-MIDSHIPMEN ONLY.

JUNE, 1880.—*Time allowed, five hours.*

1. Given an engine whose piston is 40 inches in diameter and whose stroke is 4 feet; utting off at $\frac{3}{4}$ from commencement of stroke; clearance $\frac{1}{10}$ of piston displacement per stroke; steam pressure 30 pounds per sq. inch per gauge; vacuum 26 inches barometer at 30); revolutions 50 per minute; relative volume of steam and water at nitial pressure 610 : 1; coal consumed per hour 1,831.25 lbs.; weight of cubic foot of resh water 62.5 lbs.; $\log_e 1.27 = .239$; $\log_e 1.28 = .2469$; $\log_e 1.29 = .2546$; $\log_e 1.30 =$ 2624. Required the *mean effective pressure* and the number of pounds of water evaporated per pound of coal.

2. Sketch and describe the Wabash, or Meyer valve, and explain the principal peculiarities of the Waddell valve. What is the advantage of the double ported slide valve over the single ported?

3. Water enters the boiler at a density of $\frac{7}{8}$ and is maintained at 2; temperature of he water entering is the same as the temperature of the condenser, 103° F.; vacuum 28 inches; compare the economic performance of the engine under these circumstances with the same engine, densities remaining the same, but the water in the condenser feed water) having a temperature of 135°, and corresponding pressure 2.5 lbs. per sq. inch; the mean pressure of steam being 25.46 lbs. per sq. inch, and the corresponding temperature 241° F.

4. Given the thrust T of a screw propeller, to deduce the formula for the diameter of the shaft to resist torsion due to T, and solve the following.

Example:—Diameter of propeller 16 feet; pitch 20 feet; I. H. P., 1000; speed of ship 12 knots (knot = 6082 ft.); slip 15 per cent. of speed of propeller; coefficient of metal per sq. inch of cross-section for a leverage of one foot, 120.

5. Deduce the formula for the thickness of cylindrical boiler shells, and find the thickness for a cylindrical boiler of 8 feet in diameter, for a working pressure of 80 lbs. per sq. inch per gauge; seams double riveted; value of metal 54,000 lbs. per sq. inch of cross-section; factor of safety 6.

6. How much water would be evaporated from and at 212° F. by the heat available for generating steam by the combustion of 10 lbs. of fuel composed of C 90 per cent.; O 5 per cent.; H 3 per cent.; ash 4 per cent.; burned with 25 lbs. air per lb. of fuel. Air enters at 60° F. and products of combustion escape at 600° F. Specific heats: CO_2, .217; H_2O, .475; N, .245; O, .218.

7. Given an engine 42 inches diameter of piston, and stroke $3\frac{1}{2}$ feet; clearance 3 per cent. of piston displacement per stroke; cut-off .4 stroke from commencement; mean absolute pressure, found from card, 40 lbs. per sq. inch; back pressure 4 lbs. per sq. inch; relative volume of steam and water at initial pressure 513 : 1; weight of cubic foot of fresh water 62.5 lbs. Supposing the boiler to evaporate 10 lbs. of water per lb. of coal, what is the efficiency of the whole arrangement expressed in lbs. of coal per indicated horse power per hour.

8. Find area of piston in square inches for an engine which will exert 1,300 H. P. under the following conditions: Initial pressure (p_1) 55 lbs.; final pressure (p_2) 37 lbs.; back pressure (p_3) 4 lbs.; effective work per pound of steam 72,182 foot-pounds per hour; length of stroke 3 feet; revolutions 75 per minute; volume of one pound of steam at 37 lbs. pressure 11.07 cubic feet.

MARINE ENGINES.

CADET-ENGINEERS ONLY.

JUNE, 1880.—*Time allowed, five hours.*

1. Required, the I. H. P. of a double-acting engine having a *sector* cylinder, the coal per I. H. P. per hour and the efficiency of the steam. Extreme radius of piston $=54''$; breadth of piston $=60''$; diam. of rock-shaft $=12''$; angle swept by piston $=90°$; double strokes per min. $=50$; initial pressure of steam $=40$ lbs. per gauge; cut-off at 60°; vacuum in cylinder $=24''$.

$$p \propto v^{-\frac{17}{16}}, \quad p = \frac{(15\frac{1}{2})p}{r}.$$

2. Required, the weight in tons (if applied at the periphery) of a fly-wheel of $37\frac{1}{2}$ ft. diam. for a pumping engine whose cylinder is $100''$ diam. by $8'\ 3''$ stroke. Revs. per min. $=25$; coef. of fluctuation $=\frac{1}{35}\frac{\Delta E}{f\,Pd} = 0.2$. Initial pressure of steam $=50$ lbs. per gauge. Back pressure, 4 lbs. per sq. in. absolute. Cut-off, $\frac{1}{8}$; $p \propto v^{-1}$; $\log_e 8 = 2.079$.

3. Required, the top and bottom breadths and depth of a head race, whose cross-section is a semi-hexagon, to supply 12,000 cub. ft. of water per minute. Length of race $=500'$. Loss of head from friction in race $=5'$, $f = 0.008$, $m = \left(\frac{fQ^2}{2yn^2t}\right)^{\frac{1}{5}}$.

4. Required, the H. P. of a blowing-engine to supply 225 cub. ft. (18 lbs.) of air at 32° F. per lb. of fuel. Grate surface $=378$ sq. ft. Coal per sq. ft. of grate $=15$ lbs. per hour. Temp. of air leaving blower $=100°$, gases in chimney $=480°$. The engine to give a pressure equivalent to a head of 100 ft. of gas. Net-work $=60\%$ of gross work of engine. Required, also, the temperature of the furnace when the coal is composed of $C = 0.87$; $O = 0.04$; $H = 0.05$. Mean specific heat of products of combustion $=0.238$. Density of air at 32° F., and 1 atmosphere pressure $=0.0807$.

5. Required, the I. H. P., the revolutions per minute of a double-acting engine, and the speed of the vessel in knots per hour (knot $=6{,}086$ ft.). Piston area $=2664$ sq. in. Stroke $=10$ ft. Back pressure $=4$ lbs. absolute. Clearance not considered. Diam. of rolling circle of wheels $=19'$. Resistance of vessel $=15{,}000$ ft. lbs. Friction of unloaded engine $=1.5$ lbs. per sq. in. at piston. Friction of the load $=15\ \%$ of the useful load. Coal per hour $=2{,}040$ lbs. Cut-off at $\frac{1}{4}$ stroke; $p \propto v^{-1}$; $p_h = \frac{(15\frac{1}{2})p}{r}$; $\log_e 4 = 1.386$.

6. Deduce the expression for the leverage of friction for a collar thrust. Required, he H. P. necessary to turn a shaft in a collar thrust bearing, the thrust being 50,000 bs. revolutions per min., 70. Radii of collars, 13″ and 10″. Coef. of friction, 0.05.

7. Sketch a Bourdon pressure gauge and demonstrate its action.

8. Required, the lbs. of water evaporated from 1 sq. ft. of tube surface and also from one sq. ft. of crown sheet, considering the rate of conduction to be as the square of the difference of temperatures $a = 180$. Temp. feedwater, 100°. Of furnace, 2400°. Of gases in tubes, 800°. Pressure of steam, 60 lbs. per gauge.

9. Sketch and describe Joule's proposed air engine. Construct cards from a pump and cylinder using the same scales for each. Strokes being the same, and the working temperatures being 70° and 600°.

10. Required, the lbs. of water evaporated per lb. of coal from data given on the ndicator card on sheet "B."

Available heat of 1 lb. of coal = 6,000,000 ft. lbs.

$$\tau = 1 \div \left\{ \sqrt{\left(\frac{A - \log p}{C} + \frac{B^2}{4C^2} \right)} - \frac{B}{2C} \right\}$$

For water $\begin{cases} A = 8.2591, \ \log B = 3.43642, \ \log C = 5.59873, \\ \dfrac{B}{2C} = 0.003441, \ \dfrac{B^2}{4C^2} = 0.00001184. \end{cases}$

Answers required to the first five questions and to any other three questions.

DESIGNING MACHINERY.

CADET-ENGINEERS ONLY.

JUNE, 1880.—*Time allowed, five hours.*

1. Determine by the method of augmented surface the I. H. P. necessary to drive a vessel of the following dimensions at a speed of 12 knots per hour: length on L. W. L., 325′; mean immersed girth, 60′; sines of angles of greatest obliquity of water lines, keel = 0, 1st = .1, 2d = .2, 3d = .3, 4th = .4: coefficient of propulsion 20000. Also determine the I. H. P. for same vessel by Froude's law of comparison. Dimensions of model $\frac{1}{25}$ of those of vesssel; resistance of model at a speed of 200 feet per minute, 1 lb. (consider knot as 6,000′); power utilized in propulsion 40 % of H. P.

2. Determine the diameter, inside length (between heads), and thickness of cylinders for a pair of non-condensing engines to develop 350 H. P. Revolutions per min., 80; stroke, 3′; boiler pressure per gauge, 63 lbs.; steam cut off at 10″; back pres. 2 lbs. above atm.; clearance 12.5 % of stroke displacement; exhaust closes 9″ from end of stroke; $p \propto v^{-1}$.

3. Pair of simple condensing engines; diam. of cylinder, 50″; stroke of piston, 42″; boiler pressure per gauge, 37 lbs.; vacuum, 24″; revolutions per minute, 55; cut-off at half stroke, neglect clearance; $p \propto v^{-1}$; required, diameter of single piston-rod and diameter and length of crank-pin. Deduce the formula for length of crank-pin and show that the resistance to heating is independent of the diameter. Wrought iron, $f = 36000$ for direct crushing, crank-pins ultimate strength $d = .04554 \sqrt[3]{Apl}$; for $\frac{1}{100}$ deflection, $d = .0707 \sqrt[4]{Apl^3}$; work per sq. in. of pin, 50000 inch units; coefficient of friction .05.

4. Make torsion diagram for line shaft for question 3 and determine diameter of shaft using data from diagram. Cranks being placed at right angles; scale of pressure, 32 lbs. = 1″; and $f = 54000$ for wrought iron.

5. Design a three-ported slide-valve for engine of question 3 (by a Zeuner diagram) to cut off at $\frac{3}{4}$ stroke, steam-valve opens when piston is 1″ from end of stroke, exhaust; closes 8″ from end of stroke. Required, in inches, opening of steam-port; steam-lap; steam-lead; exhaust-lap; and exhaust-lead; mark dimensions on the lines measured.

Show angle between eccentric and crank, and give distance in inches of the piston from end of stroke when exhaust-valve opens; give scale for eccentric throw; scale for crank circle $\frac{1}{8}$.

6. Design a Meyer expansion valve (by Zeuner diagram), throw of eccentric, 6″; lap of steam-valve, 2″; angular advance of main eccentric, 30°; limits of cut-off, $\frac{1}{8}$ stroke and point of cut-off of main valve; throw of cut-off eccentric, same as main eccentric. Give approximate angular advance of cut-off eccentric, and mark its relative position, that of the main eccentric, and of the crank; maximum distance the centres of cut-off and main valves will be apart; distance the cut-off blocks will be apart when cutting off at $\frac{1}{8}$ and $\frac{1}{4}$ stroke; and the width of cut-off blocks.

7. Compound condensing marine engine of 800 I. H. P., using 20 pounds of steam per I. H. P. at a pressure of 80 pounds per gauge. Design boilers to furnish steam for this engine, and to burn anthracite coal by natural draught.

Required, number, diameter, and length of boilers; thickness of shell and kind of riveting; number, size, and arrangement of furnaces; total grate surface, heating surface, and calorimeter through tubes and at uptake; diameter of tubes and number for each boiler, and total steam space.

8. From diagram (sheet B) calculate requisite condensing surface and diameter of of single-acting feed-pump of same stroke as engine. Sketch and describe Sewell's, Allen's, and Stimers methods of packing condenser-tubes.

9. Required, the length, depth, and number of buckets for a radial paddle wheel, also the greatest dip, to drive a vessel 11.15 knots per hour, the resistance at that speed being 20,000 lbs., slip of outer edge of paddles 30 % of speed of vessel, and the wheels to make 18 revolutions per minute.

DEPARTMENT OF MECHANICS AND APPLIED MATHEMATICS.

STRENGTH OF MATERIALS.

CADET-ENGINEERS ONLY.

JANUARY, 1880.—*Time allowed, four hours.*

1. Having given the angles which three conjugate stresses make with one another, determine the obliquities of those stresses, and the angles between the normals to their planes of action.

2. Derive the general differential equations for the internal equilibrium of a body.

3. Find the stresses on the parts of a half-lattice girder, uniformly loaded at every point.

4 and 5. In an isotropic substance, find the coefficients of transverse elasticity and of elasticity of volume in terms of the coefficients of direct and lateral elasticity; the coefficients of transverse pliability and of cubic compressibility in terms of the coefficients of direct and lateral pliabilities; the coefficients of direct and lateral elasticities in terms of the coefficients of direct and lateral pliabilities; and the coefficients of direct and lateral pliabilities in terms of the coefficients of direct and lateral elasticities.

6. Find the pressure on the right-hand support, the abscissa of the point of inflection, and that of the point of greatest deflection in a given uniform beam, fixed at the left-hand end, supported at the right-hand end, and loaded with the weight P at the middle point.

7. Find the proper diameter of a cylindrical shaft in terms of the moment of torsion, and of the working shearing stress of the materials of the shaft.

8. Deduce the differential equations between the dynamic head in a fluid and the motion in the direction of three rectangular axes, and prove that for steady motion

$$\frac{v^2}{2g}+h=\text{constant}.$$

THE METHOD OF LEAST SQUARES.

MONTHLY EXAMINATION: CADET-ENGINEERS ONLY.

FEBRUARY, 1880.—*Time allowed, two hours.*

1. Prove that for direct observations the equation to the probability curve is $y = c\,\varepsilon^{-a^2x^2}$. Determine the value of c.

2. Deduce the formula for the probable error in the value of a quantity determined by n direct observations.

Five measurements of a base line are as follows: 342.56, 342.47, 342.45, 342.60, and 342.58 meters; determine the length of the base line, and the probable error of this determination.

3. Having measured the following angles, $AOB = 15° 16' 25''$, $BOC = 16° 15' 30''$, $AOC = 31° 32' 00''$, $COD = 17° 25' 10''$, and $BOD = 33° 40' 50''$, determine the most probable values of AOE, BOC, and COD when the observations are of equal weight; also determine the values of the same angles when the weights of the measurements are 1, 2, 3, 4, and 5 taken in the order of measurement.

4. Having given sixteen observations of the form . . . .

$$\begin{aligned} M_1 &= s + t \sin a + u \cos a + v \sin 2a + x \cos 2a \\ M_2 &= s + t \sin 2a + u \cos 2a + v \sin 4a + x \cos 4a \\ M_3 &= s + t \sin 3a + u \cos 3a + v \sin 6a + x \cos 6a \\ &\quad \&c. \qquad \&c. \qquad \&c. \end{aligned}$$

where $a = \frac{\pi}{8}$;

determine the most probable values of s, t, and x.

5. Having measured the four angles of a quadrilateral, $x = 95° 38' 12''$, weight 4, $y = 116° 1' 40''$, weight 6, $u = 34° 20' 18''$, weight 8, and $v = 63° 59' 20''$, weight 5; determine the most probable values of the angles.

THEORETICAL NAVAL ARCHITECTURE (ELECTIVE).

JUNE, 1880.—*Time allowed, three hours.*

Cadet-Midshipmen P. R. Alger, J. B. Bernadou, H. G. Dresel, L. S. Norton, H. Phelps, W. Truxtun, A. A. Ackerman, A. R. Howze, G. E. West.

1. Derive Woolley's rule for determining volumes.

Having given three equidistant ordinates, derive a formula for computing the area between two of the ordinates in terms of the three ordinates.

2. Derive Simpson's *one-third rule*, and show when it is exact and when approximate. Determine by means of this rule the centre of gravity of a hemisphere. Show how this rule may be applied to half and quarter intervals.

Determine the angle of maximum efficiency of a rudder when the power applied is limited.

3. Show that the curve of intersection of a plane perpendicular to the axis of a wave, with a wave surface of uniform pressure, is a prolate cycloid.

Determine the height of the longitudinal metacentre of a ship.

4. Derive the formula for computing the augmented surface, and show how it may be applied to determine the probable speed of a ship when the power of the engines is known.

5. Derive Weddle's rule for quadratures.

THEORETICAL NAVAL ARCHITECTURE (ELECTIVE).

JUNE, 1880.—*Time allowed, three hours.*

Cadet-Engineers W. F. Durand, A. W. Stahl, W. S. Sample, W. F. C. Hasson, H. Hall, A. T. Woods, L. D. Miner, W. H. Allderdice, C. A. King, J. L. Wood.

1. Deduce Weddle's rule for quadratures by the method of finite differences.

2. Deduce Woolley's rule for moments, and find the centre of gravity of a hemispher by Simpson's first rule and the volume by the five-eight rule.

3. Deduce the expression for the height of the longitudinal metacentre of a ship and arrange the work for its computation.

4. Arrange the work for the computation of the statical and the dynamical surface stabilities of a ship at a given angle of heel, using only one intermediate section.

5. Having given the equivalent girder of a ship and the following data, find the greatest thrust and tension, supposing the girder to consist of an upper and a lower web and three flanges, the distance between the upper and middle flanges being 8′, and the distance between the middle and lower flanges 12′. Area of upper flange, 170 sq. in. Area of upper web, 120 sq. in. Area of middle flange, 130 sq. in. Area of lower web, 300 sq. in. Area of lower flange, 500 sq. in. Displacement, 1500 tons. Length, 200 feet.

Having given, as the result of experiments, that the radius of the orbits of the surface particles of water does not exceed one-fourth the length of the simple pendulum whose time of oscillation equals that of the waves, show that the greatest increase or decrease of a weight caused by the motion of the ship does not exceed one-fourth part of itself.

DEPARTMENT OF ENGLISH STUDIES, HISTORY, AND LAW.

INTERNATIONAL LAW.

JUNE, 1880.—*Time allowed, five hours.*

[* Starred questions are alternatives.]

I. Name the ship's papers required by international law. Describe any *three* of them.

II. State the extent of the responsibility of a neutral government for acts of subjects, (1) engaged in contraband trade, (2) building or equipping ships of war for the use of a belligerent; and explain the grounds of the distinction. State the rules of the treaty of Washington bearing on this question.

II.* "When an internal war breaks out, the government must determine whether the municipal or the international code, in whole or in part, shall be adopted." Explain what is meant by the two "codes," give the reasons for the adoption of either one, and the consequences flowing from it.

III. State the rules adopted by the British Government, in 1861, in regard to receiving prizes of the belligerents in its ports, and in regard to supplies of coal to belligerent steamers; and the rules adopted in 1854 in regard to enemies' vessels in the country at the outbreak of war, and in regard to enemies' property in neutral vessels.

III.* State the extent of exemption from local jurisdiction in foreign ports of (1) ships of war, (2) merchantmen, (3) the crews of public and private vessels. What is the rule of law in France on this subject?

IV. Define the right of search, stating when, by whom, upon whom, and in what manner, it is to be exercised, and to what extent the search may or should be carried. What is the penalty for resistance to search?

IV.* Discuss the right of convoy, giving the leading cases on the subject, and stating the general tendency of present usage.

V. Define (1) international law, (2) municipal law, (3) exequatur, (4) pre-emption, (5) embargo, (6) postliminy. Explain the difference between a domiciled foreigner and a foreigner that has been naturalized.

VI. What is the modern usage as to the treatment of irregular soldiers during war? of non-combatants? as to capture of enemy's private property on land? at sea? public property on land? What is the usage as to requisitions?

VII. Classify the various kinds of contraband goods. How far is the destination of the goods a test of their contraband character? Discuss the doctrine of *occasional contraband.*

VII.* How long does liability for a breach of blockade continue? What circumstances constitute the cessation of a blockade? Discuss the doctrine of *continuous voyages* as applied by the Supreme Court in the war of 1861–5.

VIII. A cruiser seizes at sea, for a cause that the commanding officer deems sufficient, a vessel of neutral or uncertain nationality. State in detail the captor's duties as to papers, persons, and cargo found on board, prize-master and crew, destination and delivery of prize, and state what is to be done if for any cause the prize cannot be sent in. If the ship clearly belongs to an enemy, how does that affect the case?

IX. War between United States and Great Britain. (*a*) Two American merchantmen are captured by British cruisers. One of them, the Rose, is carried into Valparaiso and condemned by a British prize-court sitting there. The other, the Estelle, is carried into Callao, and condemned by the Admiralty Court in London. Both are sold to Chilians, and afterwards come, under the Chilian flag, to the port of San Francisco. Can both, or either, be claimed by original owner? Give reasons.

(*b*) The Bonsecours, a French bark, is captured by an American cruiser, on a voyage from Bordeaux to Bristol, with a cargo of wine, the property of Eschenauer & Co., of Bordeaux and New York. One partner of the firm is an American, resident in Bordeaux, the other a citizen and resident of New York. The ship has French papers and belongs to a Frenchman. What will be the decision in regard to (1) vessel, (2) cargo?

X. War between United States and Great Britain. (*a*) In command of the U. S. S. Tennessee, cruising in the Atlantic, you capture an English brig, and send her in. It appears on the trial that she had been captured early in the war by the U. S. S. Trenton, and recaptured from the prize crew by H. M. S. Minotaur. The officers of the Trenton put in a claim for the prize. Discuss.

(*b*) Later, the Trenton is lying off Cadiz, and her boats attack and capture two English dispatch vessels at the entrance of the harbor. The prizes are brought out and burned. Discuss this, and describe the negotiations that would follow.

(*c*) Towards the close of the war you are cruising in the South Atlantic. While there a treaty of peace is made, and ratifications are exchanged on the 10th June; but 30 days from that date are allowed for captures in those waters. On the 20th June, in ignorance of the treaty, you take an English bark and send her in with a prize crew. On the 20th July she is recaptured by H. M. S. Danaë. Results?

DEPARTMENT OF MODERN LANGUAGES.

SPANISH (ELECTIVE).

JUNE, 1880.—*Time allowed, three hours.*

Translate into English.

Señores Cadetes de la primera Clase:

Cuatro años de ejercicios militares en los que habeis praticado la obediencia y el mando, han debido convenceros de la necesidad y de las ventajas de la disciplina. Permitid, sin embargo, á vuestros Instructores una observacion sobre este punto. Todos los pueblos, lo mismo que todos los ejércitos, temen la ley porque es poderosa; pero un pueblo libre, legislador de si mismo, la venera mas de lo que la teme. Vosotros sois el brazo armado de esta República; vais á representarla en las diferentes naciones del mundo, y vuestra conducta militar será, en ellas, objeto de especial observacion. Mostrad con esa conducta, señores, la obediencia del hombre libre: mostrad que la disciplina bien entendida, es decir, el respeto á la ley, y á las órdenes hasta en sus mas ménimos detalles, es para vosotros, el mas alto deber del soldado del pueblo!

El gobierno, con gran sabiduria, ha puesto esta Escuela bájo la direccion de caballeros de elevado grado, distinguidos por su saber y por sus hechos, y, como hombres

que conocen el mundo, sumamente corteses: su diario ejemplo os ha enseñado la verdad de un adagio español: "nada quita lo cortés á lo valiente." Mirad la cortesia no solo como un adorno, sino como un poder de grandes consecuencias: ella, á veces, previene desastres que su falta hubiera, tal vez, ocasionado á los pueblos. Sed delicados y fieles en vuestros negocios privados; el verdadero militar es ante todo caballero; obrad, en fin, de modo que los estranjeros digan: "las Instituciones de los Estados Unidos hacen, no solo mas felices, sino mejores á sus ciudadanos." Pero basta de consejos. Pensemos que mañana vuestras ansiosas familias, vuestros amigos os van á congratular con cariño, y con inefable sonrisa, quizas, la amiga predilecta . . . .

Vuestros Instructores juntan su afecto á aquel cariño, porque quedan satisfechos de vuestra conducta . . . .

A Dios, señores Cadetes de la primera Clase: que vuestro porvenir sea feliz.

El Gefe de Departmento, y los Instructores del ramo de Español.

Translate into Spanish.

POUR S'EMBARQUER À BORD D'UN NAVIRE À VOILES.

1. Pourriez-vous m'indiquer le capitaine du navire?
2. Oui monsieur, c'est lui qui a l'honneur de vous parler.
3. Votre serviteur Mr. à quelle heurs partez-vous demain?
4. Je partirai au premier vent favorable.
5. Quel est le prix de la traversie?
6. Trois mille francs, monsieur.
7. Je ne voyage pas seul; j'ai avec moi ma femme, deux enfants et un domestique. Ne me fera-t-on pas une diminution sur le prix du passage?
8. Quel âge ont vos enfants?
9. L'un a neuf ans, et l'autre en a sept.
10. Les enfants au-dessous de dix ans paient moitié place et nourriture; il est aussi accordé un lit pour deux enfants.
11. Avez-vous beaucoup de passagers?
12. J'en ai beaucoup et de tous les pays.
13. A quelle heure faut-il envoyer mes bagages?
14. Il faut qu'ils soient ici aujourdhui avant la nuit.
15. Combien de temps resterons-nous en route?
16. Un mois, monsieur.

GRAMMAR.

1. How many ways are there in Spanish of addressing a person?
2. Why is the pronoun subject sometimes omitted in Spanish?
3. When is *el suyo* used instead of *el de V.?*
4. How are nouns terminating in a short or unaccented vowel made plural?
5. How are those ending in a long or accented vowel made plural?
6. What is the position of the pronouns *it* and *to it*?
7. How when the verb is in the infinitive?
8. When both pronouns have to be made use of, which one comes first?
9. Explain when *to be* is to translated by *Ser* and when by *Estar*.
10. How many conjugations in Spanish? Give in a table:

(*a.*) The present indicative, first singular and plural.

(*b.*) The third person singular and plural, past definite.

(*c.*) The present subjunctive, second person singular.

(*d.*) The future first and second person singular of *Haber, Estar, Acostar, Acertar Dar, Hacer, Caber, Poder, Querer, Saber, Sentir, and Ir.*

FINAL EXAMINATION.

MAY, 1880.

CADET-MIDSHIPMEN.—CLASS OF 1878.

NAVAL TACTICS.

1. What is a general signal? How made? How may a division, squadron, or vessel be exempted from obedience to general signal? What is a special signal? How made? When does a manoeuvre commence? Define a speed signal (day and night). How is it used?

2. Draw a diagram of a fleet of 24 vessels in line, natural order. Show how it is divided into divisions and squadrons and by whom they are commanded; the position of the commander-in-chief, division and squadron commanders. State distance between vessels at half distance in close order and in open order.

3. Give diagrams of fleet in double echelon, in natural, in reverse, in inverted, and in reverse inverted order?

4. Fleet being in column of vessels in natural order heading N., form it into columns of vessels abreast by divisions at right angles to the original direction?

5. Fleet being in columns of vessels abreast by divisions heading N., change direction to the rear on any course from S. to W.

6. Fleet being in line heading N., form it into double echelons from the flanks of divisions on their left centre vessels, preserving the original direction.

7. Change from columns of vessels abreast by divisions (under sail) to a single column of vessels on the other tack with the weather division leading.

8. State how you would signal soundings when bottom is and is not reached.

GUNNERY.

1. Define elasticity, ductility, permanent set, tensile strength, density. Define cast iron, wrought iron, steel, and bronze, and compare them for strength, uniformity, elasticity, and ductility.

2. Draw and give nomenclature of 8-in. M. L. R.

3. Describe the fabrication of the XV-in. gun as included under the following heads: Furnaces, Charge, Mold, Core, Casting, Marking.

4. Describe the Butler and new Parrott projectiles, also projectiles for 3-in B. L. R. Define, twist, drift, centering.

5. Describe the compression system for central compressor and circular brake carriages.

6. What is gunpowder? Give present classification and proportion of ingredients in U. S. N. gunpowder. Describe the phenomena of explosion, and state effect of varying size and density of grains upon strain.

7. Describe the construction and stowage of magazines on board ship; arrangements for flooding and lighting, and precautions to be taken in opening and entering a magazine.

8. Describe Navy time, Schenkel, and Boxer fuzes. What is delayed action?

9. How would you take vent impressions in wax and in lead? Discuss impressions and enlargements of vents as indicating number of fires, and probable safety, in S. B. and rifled guns.

10. Describe organization and equipment of a landing party from a single ship; handling of advance and rear guards and flankers upon the march; and the preparation of houses and walls for defence.

NAVIGATION.

Time allowed, nine hours.

1. Show the relation between the departure in a given latitude and the corresponding difference of longitude. Represent by a plane triangle the quantities involved in Mercator's sailing. Explain the construction of Tables I and II, Bowditch's Navigator. Find by inspection of the tables the course and distance between two points by Mercator's sailing. Find them from a Mercator's chart.

2. State the advantages of a Mercator's chart, and the ratio in which the parallels and small portions of the meridians are expanded. Define refraction and augmented semi-diameter. In what order, strictly, should the reductions be applied to an observed altitude of a heavenly body to find the true altitude of the centre? Give the correct name of the angle obtained by applying each reduction.

3. At sea, the longitude and time being known, and the approximate bearing of the moon being SSE., the altitude of its upper limb is observed by sextant: deduce formulas for computing the latitude. Describe in detail the preparation of the data for use in the formulas.

4. In the problem of the preceding question, what additional data must be used in order to determine a line of position? Having plotted the line of position on a chart, how can you find by inspection the effect of an error in the altitude, and of an error in the time? Deduce a formula for finding the effect of an error in the time upon the resulting latitude.

5. What are the uses of a single line of position? Intersecting lines having been found from observations of the same body, and the ship having moved in the interval, how is the position found on the chart at the time of the second observation? When the altitude is taken of a body very near the meridian, what is the ordinary reduction to the meridian, and how is it used?

6. Deduce the equation of equal altitudes. Explain each step in computing the error of a chronometer when the sun is observed (a. m. and p. m.). How is the rate of a chronometer found?

7. What should be the length of a knot of the log line for use with a glass measuring 31.3 seconds of time? How is the index glass of a sextant adjusted? the horizon glass? How is the index error found? Describe the azimuth circle of a Ritchie compass, and the manner of using it to find the compass bearing of the sun.

8. How is a theodolite adjusted in order that there may be no collimation error? Give one method of running in accurately the shore line between two stations of a harbor survey, and of plotting it upon a chart on which all the triangulation points are fixed. How are the soundings taken, reduced, and fixed upon the chart?

9. What observations are made in the course of a survey to find the set and drift of the current? Define stand, slack, spring tide, and half-monthly inequality. What is a bench-mark, and what is its use?

10. What is a polyconic chart? Give its properties. Describe one complete method of making a deviation table. State the causes of semicircular deviation, quadrantal deviation, and heeling error.

11. At noon, May 23, 1880, took departure, Cape Hatteras light, in Lat. 35° 15′ 12″ N., Long. 75° 30′ 54″ W., bearing per compass NNW., and distant three miles, the ship's head SE., and the deviation for that course ½ pt. east. Variation from the chart 2° 50′ (¼ pt.) west. Thence sailed till noon, May 24, as follows:

Compass courses.	Knots.	Wind.	Leeway.	Deviation.
SE. ¼ S.	50.5	Nd. and Ed.	¾ pt.	½ pt. E.
N. ¼ E.	43	do.	do.	None.
E. by S.	47.8	do.	do.	¾ pt. E.
NW. by N. ¼ N.	17	do.	½ pt.	¼ pt. W.
NE. by E. ½ E.*	38	Nd.	do.	½ pt. E.

*Run to noon, May 24, from hour of morning time-sight.

Required, Lat. and Long. by D. R. at noon May 24, 1880. Course and distance by D. R. from the light-house. May 24, 1880, Obs. merid. alt. sun's lower limb 76° 11′ 40″ bearing south. In. cor. — 1′ 10″. Height of eye, 18 feet.

Required, the latitude.

May 24, 1880, a. m. W. T. obs. 7^h 52^m 33^s, C-W. 3^h 52^m 10^s, c. c. + 1^h 08^m 16^s. Obs. alt. sun's lower limb 35° 49′ 10″. In. cor. — 1′ 10″. Height of eye, 18 feet. Bearing of the sun by standard compass N. 84° 10′ E. Ship's head ENE.

Required, longitude at noon, May 24, 1880; total error and deviation of the compass; set and drift of the current.

12. Find the time of high water on May 24, 1880, at Singapore, in Lat. 1° 17′ N., Long. 103° 50′ E., the establishment of the port being 9^h 45^m.

13. At sea, May 25, 1880, in morning twilight. Long. 72° 12′ W. W. T. obs. 4^h 20^m 23^s a. m., C-W. 10^h 12^m 47^s, c. c. + 6^h 51^m 14^s. Obs. alt. of star and Ursæ Minoris (Polaris) 38° 12′ 30″. In. cor. — 1′ 10″. Height of eye, 18 feet.

Required, the latitude.

14. At sea, May 26, 1880. Long. 145° 36′ East. Obs. merid. alt. noon's upper limb 35° 30′ 20″ bearing south. In. cor. — 1′ 10″. Height of eye, 18 feet.

Required, the latitude.

15. Each cadet-midshipman will take observations in the field and find the chronometer error, the error of the compass, and the apparent altitude of a designated object on the opposite side of the Severn River. Height of observer's feet above the sea level, 20 feet. Distance from the observer of the shore line below and in the same vertical circle as the designated object, 3,300 feet.

NOTE.—Questions 8, 13 and 14 are alternatives. Double weight is assigned to question 15.

FRENCH.

Translate into French.

MILITARY EDUCATION AMONG THE ROMANS.

Everything contributed to inspire the Romans with martial ardor. The continual wars they had to maintain against their neighbors made the art of war necessary and familiar to them; and even the plough, which constituted their usual employment, prepared them for military toil. Rural occupations harden and fortify the soldier, whereas the trades practised in towns are only fit to enervate him. Fatigue cannot discourage him who exchanges the plough for the sword. The Roman soldiers were accustomed to walk in five hours twenty and sometimes twenty-four miles, and on the march they carried sixty pounds weight. Young Romans of every condition hardened themselves by martial exercise. After long races on foot or on horseback, they threw themselves, covered with sweat, into the Tiber, which they swam across. It was thus officers and soldiers were formed; and "the Roman youth," says Sallust, "as soon as they were able to carry arms, learnt the art of war by performing in the camps the most arduous tasks. They prided themselves not in giving feasts or submitting to pleasure, but on having beautiful arms and horses. No difficulty discouraged such men, and no enemy inspired them with fear; their courage rendered them superior to all; emulation fired their mind, and to distinguish themselves by some noble action was all their ambition. It was thus they endeavored to secure the esteem of their countrymen—in this they conceived true nobility to consist." The soldiers thus hardened from their earliest youth enjoyed good health, and the Romans who waged war in so many climates do not appear to have suffered much by illness, whereas it often happens in our days that armies, without having fought, disappear in a single campaign.

Translate into English.

LES FEUX DE ROUTE.

Les feux de côté.
Le feu vert de tribord.
Le feu rouge de bâbord.
Le feu blanc de tête de mât.
Montrer un feu d'une partie visible du bâtiment.

Règlements et règles relatifs à la route, pour prévenir les abordages à la mer.

Quand deux navires font route au plus près, avèc des amures différentes, celui qui a les amures à bâbord manœuvre toujours, s'il en est besoin, soit en laissant arriver, soit en virant vent devant.

Vent de travers, dérangez-vous pour ceux qui sont au plus près. Deux navires qui ont du largue et qui se recontrent courant à peu près l'un sur l'autre, doivent passer à bâbord l'un de l'autre.

Sous vapeur et courant à peu près l'un sur l'autre, tous deux viennent sur tribord, pour passer à bâbord l'un de l'autre.

Un vapeur se dérange toujours pour un navire à voiles; il faut bien se rappeler que tout navire sous voiles, ayant de la vapeur, mais ne s'en servant pas, est considéré comme navire à voiles, en cas d' abordage.

Tout navire en marche doit porter un feu vert à tribord et un feu rouge à bâbord.

Les navires à vapeur portent, en outre, un feu blanc en tête du mât de misaine.

Les feux de côtés doivent être pourvus, en dedans du bord, d'écrans s'étendant à trois pieds au moins, en avant de la lumière afin que le feu d'un bord ne puisse pas être aperçu du bossoir de l'autre bord.

Les navires qui remorquent portent deux feux blancs en tête de mât.

En temps de brume, les navires à vapeur en marche font aller leur sifflet à vapeur, les bâtiments sous voiles font usage d'un cornet à bouquin; à l'ancre on sonne la cloche.

Ces signaux doivent se faire entendre, au moins une fois, toutes les cinq minutes.

Translate into English.

PAVOISER.

Monsieur, Je viens vous prévenir que, demain matin, nous pavoiserons en l'honneur de l'anniversaire de l'Indépendance et vous demander si vous voudrez bien vous associer à cette fête, en pavoisant également votre navire?

Certainement, monsieur, car je suis heureux de saisir cette occasion de vous faire voir que nous aimons à sympathiser avec vous, nous mettrons donc tous nos pavillons dehors. Dites-moi, s'il vous plaît, à quelle heure vous hisserez les vôtres?

Juste aux couleurs, c'est-à-dire, à 8 heures précises et en même temps, nous ferons une salve de vingt et un coups de canon. Vous entendrez également résonner les pièces que j'ai sur le pont, au moment où nous casserons les genopes et où votre pavillon se déploiera en tête du grand mât. Nous vous sommes bien obligés. J'ai encore à vous dire que pour fêter davantage ce beau jour, nous donnons un bal à bord, dans l'après-midi, et nous espérons que vous voudrez bien l'honorer de votre présence; voici la lettre d'invitation que le commandant vous adresse, à vous et à vos officiers.

Je vous remercie bien, nous acceptons de grand cœur et nous ne manquerons pas d'aller à la fête, partager votre joie. Ainsi, nous pouvons compter sur vous? Vous pouvez y compter, sans faute.

Conversation entirely in French.

Subjects:

Une visite à bord d'un navire de guerre.
La force des différentes flottes.
Au retour d'une longue campagne.
De la navigation ancienne.
Mon dernier itinéraire.
Conversation avec un pilote français.
Comparaison de l'etat major de l'armée navale française avez la nôtre.

INDEX TO EXAMINATION PAPERS.

Page.
Algebra, candidates for admission as Cadet-Engineers 68
Algebra, fourth class 80, 81
Analytical Geometry, third class 89
Arithmetic, candidates for admission as Cadet-Midshipmen 64, 65
Arithmetic, candidates for admission as Cadet-Engineers 68
Astronomy, second class, Cadet-Midshipmen 99
Calculus (elective), third class 90
Calculus, second class 103
Calculus (elective), second class 105
Constitution of the United States, third class 92, 93
Curve Tracing (elective), fourth class 82
Descriptive Geometry, fourth class, Cadet-Engineers 82
Descriptive Geometry, third class, Cadet-Midshipmen 88
Descriptive Geometry, third class, Cadet-Engineers 89
Designing Machinery, first class, Cadet-Engineers 115
Designing Machinery, second class, Cadet-Engineers 101
English and History, fourth class 84
English, fourth class, monthly examination 83
English, fourth class 84
European History, third class 92
French, fourth class 86
French, third class 95
French, second class 106
French, class of 1878 123
Geography, candidates for admission as Cadet-Midshipmen 65, 66
Geography, candidates for admission as Cadet-Engineers 70
Geometry, candidates for admission as Cadet-Engineers 69
Geometry, fourth class 81
Grammar, candidates for admission as Cadet-Midshipmen 64, 65
Grammar, candidates for admission as Cadet-Engineers 70
Gunnery, second class, Cadet-Midshipmen 98
Gunnery, class of 1878 121
Gunnery, second class, Cadet-Midshipmen 98
Heat, second class 100
History, European, third class 92
History of the United States 85
History, Naval, third class 94
Integral Calculus (elective), third class 90
International Law, first class 118
Marine Engines, first class, Cadet-Midshipmen 113
Marine Engines, first class, Cadet-Engineers 114
Mechanics (elective), second class 105
Mechanics, second class 104
Method of Least Squares, first class, Cadet-Engineers 117

	Page.
Natural Philosophy, candidates for admission as Gadet-Engineers	69
Naval Architecture (elective), first class, Cadet-Midshipmen	117
Naval Architecture (elective), first class, Cadet-Engineers	117
Naval History	94
Naval Tactics, Cadet-Midshipmen	98
Naval Tactics, class of 1878	121
Navigation, first class, Cadet-Midshipmen	110
Navigation, practical, first-class, Cadet-Midshipmen	112
Navigation, class of 1878	122
Ordnance and Armor, first-class, Cadet-Midshipmen	109
Ordnance and Armor, second-class, Cadet-Midshipmen	98
Physics, third class	91
Punctuation, fourth class	83
Rhetoric, third class	93, 94
Seamanship, first class, Cadet-Midshipmen	108
Seamanship, second class, Cadet-Midshipmen	97
Ship-Building, first class	108
Spanish (elective), first class	119
Spanish (elective), third class	96
Spelling, candidates for admission as Cadet-Midshipmen	65, 66
Spelling, candidates for admission as Cadet-Engineers	70
Strength of Materials, first-class, Cadet-Engineers	116
Surveying and Compass Deviations	111
Trigonometry, third class	87

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Annual register 1880-1881

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